THE INDUSTRIAL ARTS MAGAZINE

NOVEMBER 1926

THE BRUCE PUBLISHING COMPANY
MILWAUKEE, WISCONSIN

ATKINS
SILVER STEEL SAWS

TEACH SAW SETTING AND FILING BY ATKINS EASY METHOD

We will loan Manual Training Instructors in woodworking an Atkins Silver Steel Demonstrating Saw for eight weeks. Shows clearly the proper way to file and set the carpenter's most important tool—the saw. It will be a big help in your class work.

Atkins' Famous Improved Perfection Handle is also included to show the new improved and easier method of sawing. Write at once for literature.

Saw Sense illustrates many popular patterns of Atkins Saws and explains roof framing, shingling, care of saws, etc. Can be had for your entire class.

Atkins new Free Text book contains valuable information for all those interested in saws and sawing.

A Perfect Saw For Every Purpose

Atkins Always Ahead

E.C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta
Memphis
Chicago
Minneapolis
New Orleans
New York City
Portland, Ore.
San Francisco
Seattle
Paris, France
Vancouver, B.C.

The Proper Finish for Projects of Wood

THE finishing of projects of wood is most important and should receive its full share of attention. Every Instructor of woodworking realizes that a beautifully constructed model may be ruined if improperly finished, whereas the defects of poor construction are minimized if the model is well finished.

For years we have kept our fingers on the pulse of progress of Industrial Arts and Vocational Education. We have striven to meet their Wood Finishing needs. That we have been successful is demonstrated by the fact that Johnson's Artistic Wood Finishes are used in nine-tenths of the schools in the United States and Canada. The endorsement of the world's foremost Instructors of Industrial Arts and Vocational Education is a convincing tribute to the merit of our products.

Our line of Artistic Wood Finishes is complete—it includes *Johnson's Wood Dye, Paste Wood Filler, Under-Lac, Polishing Wax, Varnishes, Enamels,* and *Undercoats.* They are all easy to apply—the youngest and most inexperienced pupils can use them with splendid results.

JOHNSON'S WOOD DYE

With Johnson's Wood Dye inexpensive soft woods may be finished so they are as beautiful and artistic as hardwood. All shades may be easily lightened or darkened. Directions on every label.

17 Beautiful Shades for STAINING WOOD

Johnson's Wood Dye penetrates deeply, bringing out the high lights of the wood without raising the grain. It is simple to apply—goes on easily and quickly without a lap or a streak.

FREE—*this valuable book*

Our new "Text Book on Wood Finishing for Instructors and Students of Industrial Arts and Vocational Education" is just off the press. Wouldn't you like a copy for each boy studying woodworking? We will gladly send the required number Free and Postpaid to Instructors who are using or will use Johnson's Artistic Wood Finishes in their woodworking shop. Use coupon at right.

We have a complete set of Wood Finishing Job Sheets (eight in all) which show job specification—job application—material—tools and equipment—procedure, etc. We will gladly send these Job Sheets postpaid and free of all charge to Instructors of Wood Finishing.

S. C. JOHNSON & SON, Dept. I. A 11. RACINE, WIS.
"The Wood Finishing Authorities"

We have ..... boys studying woodworking and would appreciate receiving the following material:

☐ *Wood Finishing Job Sheets*
☐ *Text Books on Wood Finishing*

We buy most of our Wood Finishes from.....

NAME.....

ADDRESS.....

CITY AND STATE.....

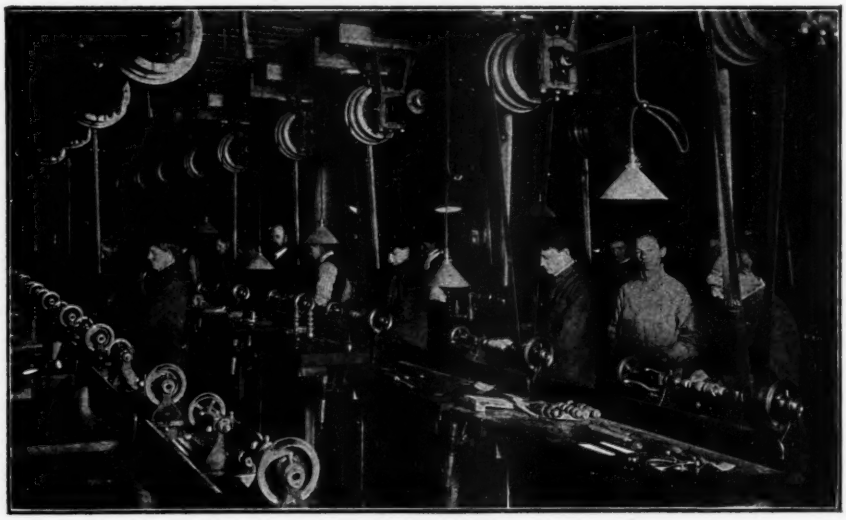
THE JOHNSON FRICTION CLUTCH

as Used Fifteen Years In

The Stuyvesant High School

New York City.

150 Clutches Used on the Lineshafting in the Manual Training Department, in the New Building.



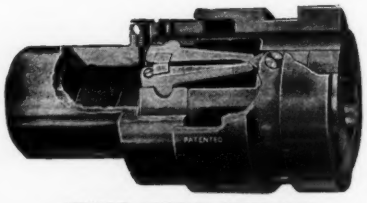
Courtesy: The Stuyvesant High School, New York, N. Y.
(View of original installation in old building of 30 Clutches.)

A record like this ought to convince even the most skeptical that the Johnson Friction Clutch is a money saver and not an expense.

Equip your shafting with Johnson Clutches and forget your troubles.

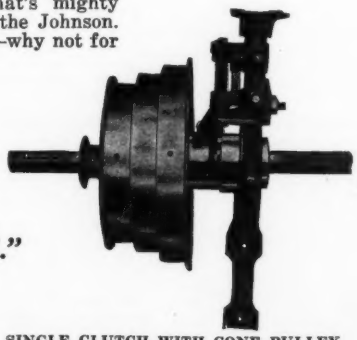
Any size of steel split, solid iron or cone pulleys may be mounted on the Clutch hub.

The school authorities of the great rich city of New York in their official specifications designate Johnson Clutches BY NAME. That's mighty strong OFFICIAL endorsement for the Johnson. Good for Greater New York schools—why not for yours?



SINGLE CLUTCH SECTIONED.
Single Clutches for line shaft drives where high speed is desired.

Write for Catalog "I.A.M."



SINGLE CLUTCH WITH CONE PULLEY MOUNTED AND STYLE "A" SHIFTER BRAKE MECHANISM.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

You guide more than his hand

when you give him Quality Tools

You teach him a trait that will serve him all his life in whatever vocation he chooses .... Efficiency!

You teach him to prize those qualities of neatness —of accuracy—of saving time. You instill in him an appreciation for a job well done.

Do not let him struggle along with inferior tools .... wasting time .... bungling work.

But give him real tools. Tools that he can depend upon—that give him confidence to go ahead and do the job.

You can trust Disston Saws, Tools and Files in school. Many of them were developed for the use of the growing boy. They stand the strenuous service that a boy will put them to.

Write for information about Disston Quality Tools for Schools. Dept. L.

New Saw Charts Ready for Your Use

Just completed. Two instructive wall charts showing how to use a cross-cut saw and how to use a rip saw. Sixteen pictures clearly illustrate each step. Sent free to any instructor who mails the coupon below.

HENRY DISSTON & SONS, INC.

Makers of "The Saw Most Carpenters Use"

PHILADELPHIA, U. S. A.

DISSTON

SAWS TOOLS FILES KNIVES STEEL

Mail this coupon

HENRY DISSTON & SONS, INC.
Dept. L, Philadelphia, U. S. A.

Send me free, all charges paid, your new set of illustrated saw charts.

Name.....

School.....

City..... State.....

This Machine Will Do All Your Sanding

The Clarke Vacuum Portable Sander is a practical, modern, fast-working machine, designed for sanding all flat surfaces, quickly, efficiently and economically. It has a wide range of uses from heavy duty work to the very finest cabinet finish. It is particularly adapted for use in woodworking shops in schools.

EASY TO USE

Operated like a hand plane, it is easy to use and any boy can quickly learn its operation on all classes of work. It weighs only 22 lbs. and can be taken to the job and used anywhere. The vacuum bag eliminates all dust and there is no cleaning up after the job is sanded.

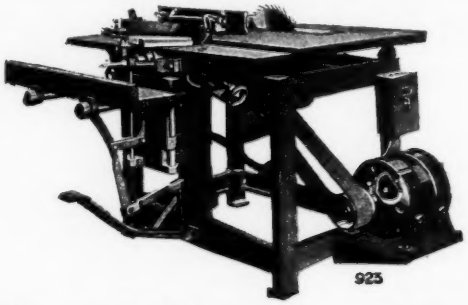
Clarke Vacuum Portable Sanders are used in woodworking shops, industrial plants, and by contractors and builders—***It is the logical sander for school use.***

Clarke Vacuum Portable Sanders run off any electric light socket, either alternating or direct current. They are equipped with our own super motors, wound entirely by hand, and for their size and weight the most powerful and long lived motors in use today. The sandpaper is changed in less than two minutes; one sheet sands for several hours and costs but a few cents.

Let us make a demonstration in your shop—no obligation. Write to

POWERFUL - FAST CUTTING
CLARKE
VACUUM PORTABLE SANDER

CLARKE SANDING MACHINE CO.
618-22 W. LAKE ST. CHICAGO, ILL.



This machine *is a whole woodworking shop in itself!*

With one of these variety woodworkers in your manual training shop there is not a woodworking operation which cannot be performed well and quickly. It does fourteen different kinds of work. Three students can work at it at once.

When you write inquire about our Sander, Universal Saw Bench, Lathe and Band Saw.

AMERICAN
SAW MILL MACHINERY CO.
MAKERS OF WOODWORKING AND SAW MILL MACHINERY
74 MAIN STREET, HACKETTSTOWN, N. J.

"CLARK" SPECIAL PATTERN MAKER'S GRINDER

"First in the Field"

No. 2 arranged as Disc Grinder

This is our standard No. 2 Grinder mounted on a pedestal. Disc grinder arrangement has adjustable and reversible steel disc. Opposite end is arranged for cup wheel of special texture for dry grinding wood working chisels, which should be ground on the face of the wheel instead of the periphery. One disc and grinding wheel supplied.

Copy of our catalog will be sent on request.

JAS. CLARK, JR., ELECTRIC CO.
605 E. BERGMAN ST., LOUISVILLE, KY.

"Oliver" Surfacer, Universal Saw Bench, Band Saw, Tenoner and Vises are shown in Photo. "Oliver" Oilstone Tool Grinder, Mortiser and Wood Trimmer are also installed in this department of the Battle Creek Schools.

BATTLE CREEK SCHOOLS USE "OLIVER" TOOLS

Mr. W. G. Coburn, Supt. of Schools, and Mr. G. G. Price, Manual Training Director at Battle Creek, Mich., believe in getting everything possible from their equipment.

Above is a view of the Woodworking Department at the Vocational School—"Oliver" equipped, we are proud to say. When the photo was taken they were engaged in making 22 desks (shown at left and in centre of picture), 22 tables (shown just back of Universal Saw Bench), and several other pieces of furniture and cabinets for the Board of Education.

Some of the boys were making book stands, foot stools, etc., for their homes. All of the work was a credit to the classes, and the instructors, and a worthwhile saving was made for the Board of Education.

Many schools in all parts of the world are doing commendable work of this sort on "Oliver" Woodworking Machinery.

Have you an "Oliver" Catalog No. 22? If not, send for it.

Oliver Machinery Company

Grand Rapids, Michigan.

Modern Schools Choose Union Machines—

Because Union machines are ideally suited for school use. Schools can afford to install enough Union machines to give every student actual practice. They are compact, rugged and speedy. They embody the most advanced ideas in modern woodworking plant equipment. Leading manufacturers choose Union Machines because they do their work at half the cost of more expensive and bulkier machines. They will give you more service and satisfaction for your money. Reorders from satisfied school customers proves this. Write today for complete information.

Send For This Catalog It's FREE

GALLMEYER & LIVINGSTON CO.

214 Straight Ave., Grand Rapids, Mich.

UNION PORTABLE AND BENCH TYPE WOOD WORKING MACHINES

Improve Your Shop Equipment

Huther Bros. Dado Head

A Huther Brothers Dado Head will speed up and simplify your intricate cutting and grooving. It consists of two outside cutters and enough inside cutters to perform the required cut. The cutters can be used in pairs or in any combinations desired.

Huther Bros. Cutter Head

Huther Brothers Round Cutter Head is especially desirable for jointing and running light mouldings on saw mandrels. The knives are set with the use of a headless set screw and flanged side plates strengthen the head and keep knives from twisting while being set.

HUTHER BROTHERS SAW MANUFACTURING COMPANY

Rochester, N. Y.

Makers of Better Saws for More Than 50 Years

Write for catalog No. 46 illustrating and describing the entire Huther Line.

No cutting tool is better than its edge Keep the tools sharp

PLURALITY OILSTONE TOOL GRINDER

THE most convenient, serviceable and efficient tool sharpening machine ever made.

This new Tool Grinder has been carefully designed to combine many new advantages with the essential features of older models. It combines five basic units in one machine: *coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel,* and all accessible from two adjacent sides.

It is motor driven, ball bearing throughout, and every unit is thoroughly guarded.

Write for full descriptive bulletin.

MUMMERT-DIXON CO.

Hanover, Pa.

Originators and Pioneer Manufacturers of Oilstone Tool Grinders

The Planer Saw
For Smoother Cutting

School shops which have used the new SIMONDS PLANER SAW are getting economical results and better work. For hand feed cutting it produces work practically as smooth as a planer knife. It cross-cuts and rips equally well on hard or soft wood. It can be used for mitre-work or jointing. Made 6 to 24 inches in diameter.

Specify the Planer Saw when ordering.

SIMONDS
Saw and Steel Company
ESTABLISHED 1832 — FITCHBURG, MASS.

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MONTREAL, QUE.

When Classes Are Crowded

Then is when you appreciate the clean-cut compactness of the Buffalo Down Draft Double Forge. Two forges in the space of one. No complicated overhead piping. Big saving in initial cost, and practically no maintenance or replacement costs.

Buffalo Down Draft Forges have been adopted by 90% of all the schools and colleges in the U. S. teaching forge practice. Used by many of the large railroads and industrial establishments all over the world.

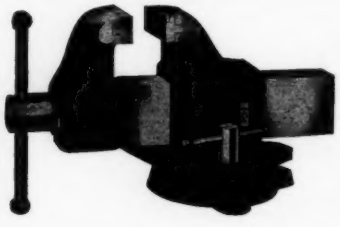
"Buffalo" *Down Draft FORGES*

The Down Draft feature originated by "Buffalo" effectively removes all smoke and gases before they escape into the room, and in addition provides complete ventilation for the shop. All pipe connections are under the floor—out of the way.

Our engineers will gladly co-operate with you in planning a modern shop layout. Write for catalog.

Buffalo Forge Company

482 Broadway Buffalo, N. Y.



Fine Tools Bring Skill

There's something in the "feel" of a fine tool which brings out all the latent skill in even the untrained mechanic. And as skill develops, the love of fine tools grows.

The privilege of working with the best in tools is always a great incentive. In training classes or in actual shop practice, the strength, precision and adaptability of Columbian Vises makes them a favorite. There is a type and size of Columbian Vises for every special purpose.

We'll gladly send illustrated literature and prices.

THE COLUMBIAN VISE AND MFG. CO.
Successors to The Columbian Hardware Co.
Cleveland, Ohio.

COLUMBIAN VISES

Trade Mark - Reg. U. S. Pat. Off.

THE "EAGLE" ANVIL

The standard anvil for Schools. No deafening ring. Lessons given and heard without interference.

A DECIDED PREFERENCE FOR USE IN MANUAL TRAINING SCHOOLS

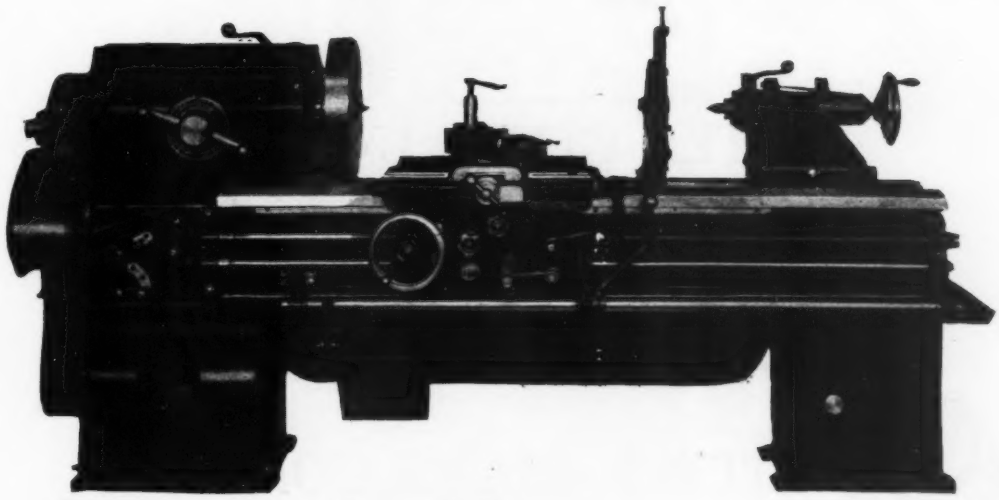
— A FEW OF THE MANY USERS —

Tilden High School, Chicago, Ill.
Manual Training High School, Brooklyn, N. Y.
Bushwick High School, Brooklyn, N. Y.
Camden High School, Camden, N. J.
Lawrence High School, Lawrence, Mass.
Mass. Institute of Technology, Boston, Mass.
Mechanics Arts High School, Boston, Mass.
Rensselaer Polytechnic Institute, Troy, N. Y.

Manufactured Since 1843 by the Eagle Anvil Works

FISHER & NORRIS — TRENTON, N. J.

A Brand New Idea in Geared Head Lathes



Eight Speeds with a Single Lever

IT took years of study and experiment to work it out—but now it's here—a new Sidney Geared Head Lathe with spindle controlled by a single lever.

No complicated system of lever motion for the student to remember. Eight speeds are clearly marked on the dial. Simply turn the lever to the speed desired as indicated by the pointer—and you have it. It is not even necessary to stop the spindle. The change can be made with the spindle running.

Even the most inexperienced student cannot clash the gears—for the gears are always in mesh. And the gears themselves are of wide, deep mesh type of hardened steel.

Full force feed oiling, similar to that on the finest automobiles, keeps every bearing constantly lubricated. No attention required except to keep oil supplied.

So simple is its operation, so foolproof its construction, that breakdowns resulting from the ignorance of students will be almost totally eliminated.

Keep abreast of developments. Write today for bulletin on this new lathe built on a revolutionary principle. Address Dept. 411.

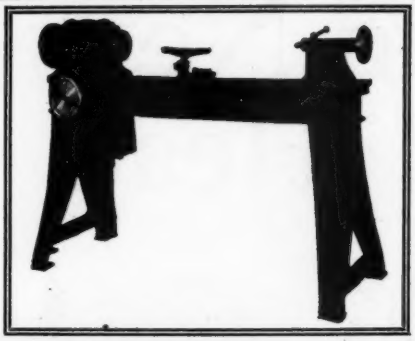
The Sidney Machine Tool Co.
SIDNEY, OHIO

The New

SIDNEY

Single Lever Control Geared Head Lathe

SIDNEY SERVICE



LITTLE GIANT LATHES!

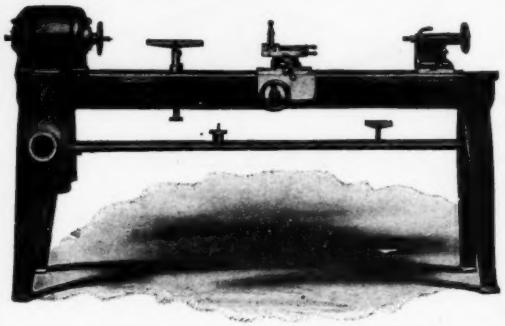
Little Giant Lathes insure Safety. The Headstock Lathe eliminates all belting, pulleys and shafting, making the operation so simplified that all danger is removed. The rugged design and the built-in accuracy insure the highest character of work. The best of materials are used throughout. All moving parts run silently and smoothly on ball bearings. Vibration is practically eliminated. Little Giant Lathes are the choice of schools because boys can operate them as safely as experienced men. The high quality construction of our machines enables us to guarantee Little Giant Equipment, not for a period of years—but unreservedly against all defects of material and workmanship. Write today for full details of Little Giant Equipment and descriptive catalog.

LITTLE GIANT

LITTLE GIANT COMPANY

223 Rock St. Mankato, Minn.

Manual Training Schools
MOTOR HEADSTOCK LATHES

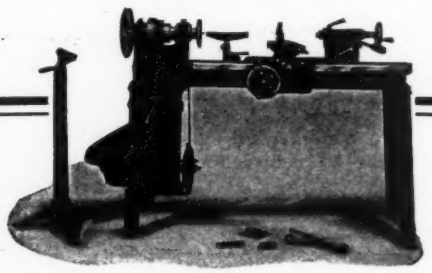


We manufacture manual training school motor headstock lathes for either alternating or direct current; as well as a complete line of saw benches and planers. Two of the largest manual training schools in St. Louis have recently been fully equipped with our machines. Built to give service and as nearly fool proof as possible.

Write For Complete Information

Hall & Brown Woodworking Machine Co.

BROADWAY, TYLER, NINTH STS., ST. LOUIS, U. S. A.



A Man's Lathe— For Training Boys

Some boys now learning to use a lathe will become machine tool operators. Others will become managers of men and machinery buyers.

To both, first training on **GTD** lathes, gives a sound foundation. Built for training use, these lathes are machine tools of the same high standard used in perfectly equipped industrial plants.

Special features provide safety, economy and wide capacity.

WRITE FOR BULLETIN 104

MACHINE TOOL DIVISION

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASSACHUSETTS

"It's *Real* White Pine," ' ' '

says the "Super" to the President

The President, on a visit to the pattern shop, handles a piece of the fine, soft-textured, light weight Sugar Pine pattern stock, as the "Super" remarks, "It's *real* white pine—the finest pattern wood I know!"

When the President asked, "Why do you say, 'real' white pine?" the "Super" told him there are but three genuine white pines in commercial use for pattern work, and pointed out the economy of price and shop cost of using Sugar Pine, a genuine white pine, as compared with other pattern woods.

The "Super's" practical experience has proved Sugar Pine's superior working qualities with the knife, saw, chisel and plane, its gluing and painting advantages, and the ease with which it takes nails and holds them without splitting.

Then the "Super" read to the President the scientific facts, quoting from Technical Note No. 215, issued by the Forest Products Laboratory of the U. S. Forest Service, Department of Agriculture, Madison, Wis., as follows:

> "Of the dozen or so botanical species of true white pines grown in the United States, three are of outstanding importance in the lumber industry. They are, eastern white pine (*Pinus strobus*), western (Idaho) white pine (*Pinus monticola*), and sugar pine (*Pinus lambertiana*) ' ' ' "There is no absolutely positive means of identifying the three white pines one from another, microscopically."

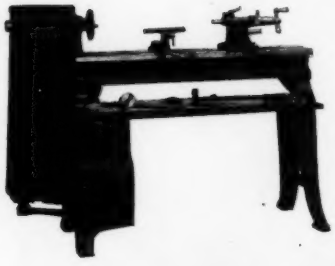
Why not use Sugar Pine in *your* pattern shop?

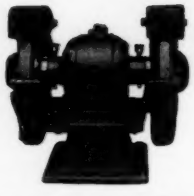
Order a small supply and have your own "Super" try it. That's the first step toward using it continuously.

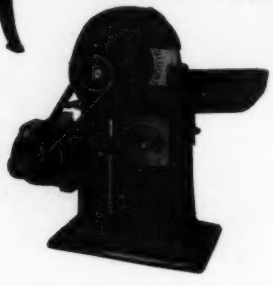
CALIFORNIA WHITE AND SUGAR PINE MANUFACTURERS ASSOCIATION

60 663 CALL BUILDING • SAN FRANCISCO

SUGAR PINE GENUINE WHITE PINE







"Blount" Products

SINCE 1888

J.G. BLOUNT CO. EST. 1888

Dependability and Service

Blount Lathes and Grinders are the result of specialization and experience in the manufacture of a limited line of products. A consistent policy of undivided attention and striving to attain the best in lathe and grinder production has won this outstanding reputation for service of Blount Products. Simplicity of design, sturdy rigid construction, ample bearings, great load capacity, ease and safety in operation are built-in characteristics of Blount Products.

LATHES — 5 types — Variable Speed Motor Headstock, Motor-in-Leg, Motor-on-Rear-Shelf, Belt Countershaft Driven and Patternmaker's—floor or bench style—bronze or deep groove ball bearings —11"-13"-16" swing beds—3'-12' long.

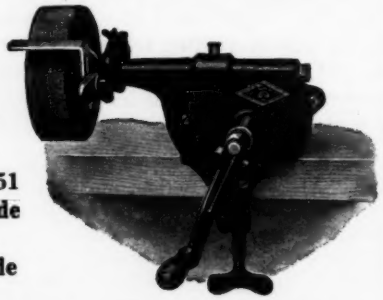
GRINDERS—3 types—2-Wheel Floor or Bench Grinders, belt or motor driven, self-oiling or ball bearings—6"-18" wheels. Combination Grinders and Buffers, belt or motor driven, self-oiling or ball bearings, 8"-14" wheels. Wet Tool Grinders, belt or motor driven—self-oiling bearings with special centrifugal pump for water circulation, 14"-20"-30" wheels.

Descriptive catalog on request

J. G. Blount Co.,
Everett Mass.

Sharpen Edge Tools
on a LUTHER TOOL GRINDER

Ask for catalog and prices.



The No. 51 Best Maide is the Best Made

Manual training instructors, skilled mechanics, carpenters and pattern makers have found that Luther Grinders are the safest and most practical tool grinders made—excellent design and workmanship—a real quality product.

Grinder illustrated is our No. 51 Best Maide, ball bearing, swivel type hand grinder, equipped with combination (medium and fine) grinding wheel, especially adapted for grinding edge tools. No. 51 is equipped with 5x1½x⅞" DIMO GRIT grinding wheel and plain tool rest.

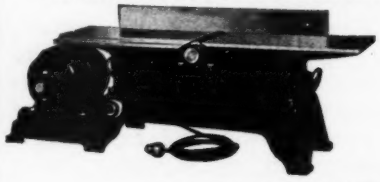
A special chisel and plane bit holding attachment can be furnished — insures uniform, accurate hollow ground bevel always.

LUTHER GRINDER MFG. CO.,
285 SO. WATER STREET,
MILWAUKEE, WISCONSIN.

MORE EQUIPMENT FOR THE SAME MONEY

Bench or Floor Type — Portable Electric — WOODWORKING H&A MACHINERY — Bench Machines — For Lamp Socket Use

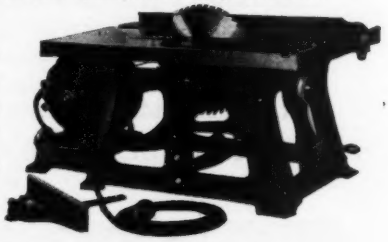
MAKE YOUR DOLLARS GO FARTHER
GIVE YOUR STUDENTS BROADER TRAINING



Hundreds of schools are enthusiastic users of H & A machines.

ANY SCHOOL CAN AFFORD
H & A MANUAL TRAINING EQUIPMENT

We make a complete line. Every machine sold on a money back guarantee of satisfaction.



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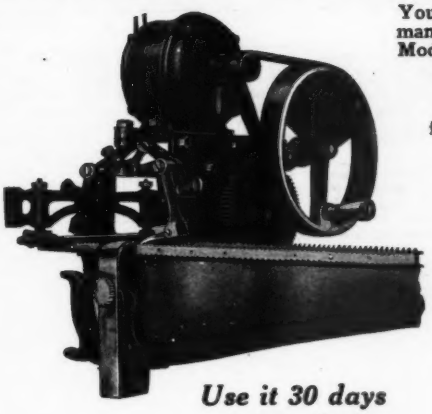
Keeps 2000 Saws Sharp!



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Minneapolis, Minn.
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On June 12, 1926, we began using your Foley Automatic Saw Filing equipment, Model F-5. This Department has under its care two thousand saws consisting of all types from mitre box to band saws, which are in constant use by the Manual Training Departments of the Minneapolis Schools and our own repair department. The installation of the Model F-5 Foley Automatic Filer has enabled us to file in fifteen minutes a band saw which took two hours to file by the hand method; other filing time has been reduced by one-half. We have found the equipment exceedingly satisfactory.

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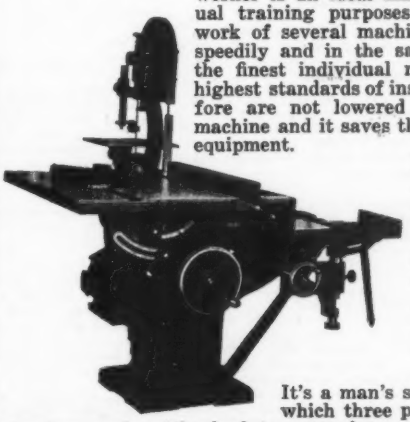

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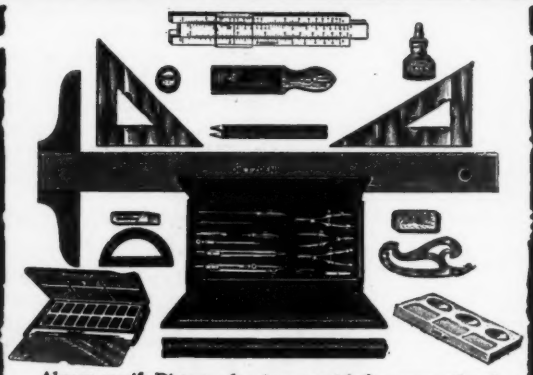

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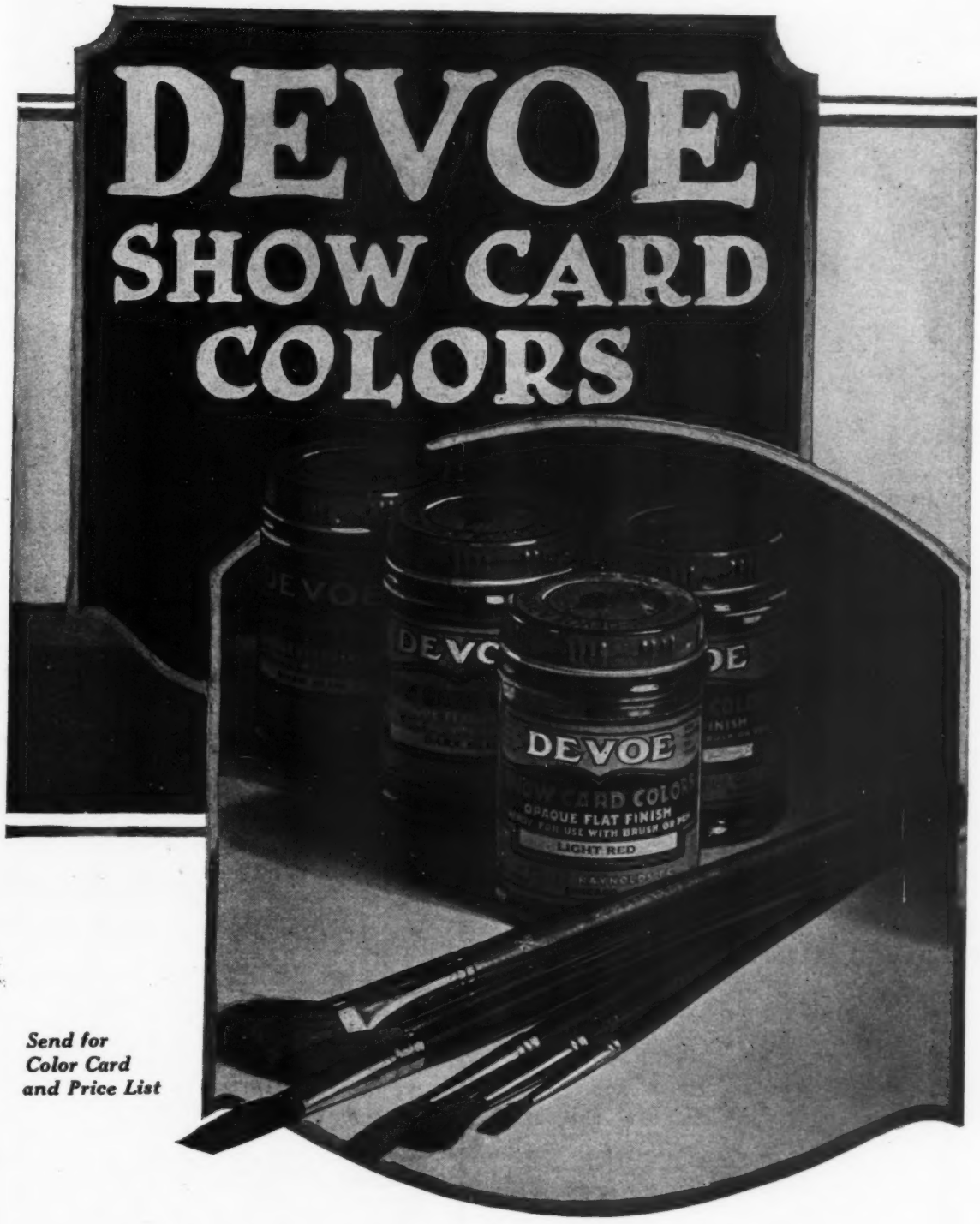

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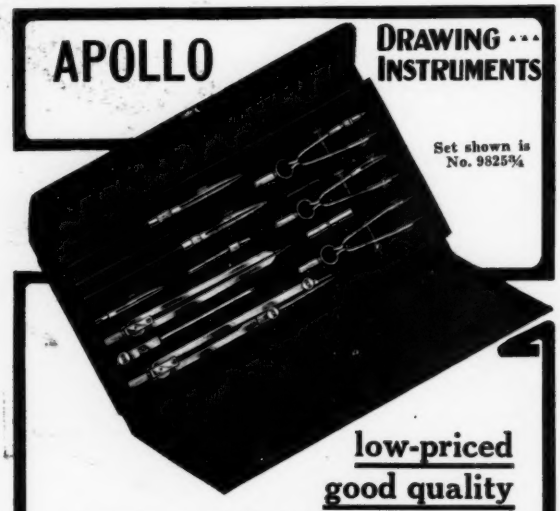

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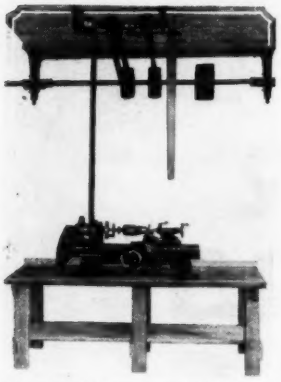

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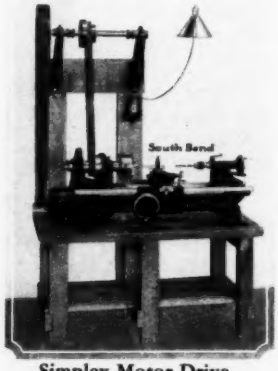

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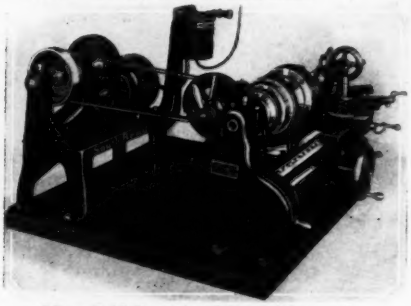
This form of Drive is especially suited for driving Bench Lathes. It consists of an Electric Motor, a Special Countershaft mounted on top board of Bench and a Control Switch for starting, stopping and reversing Lathe.



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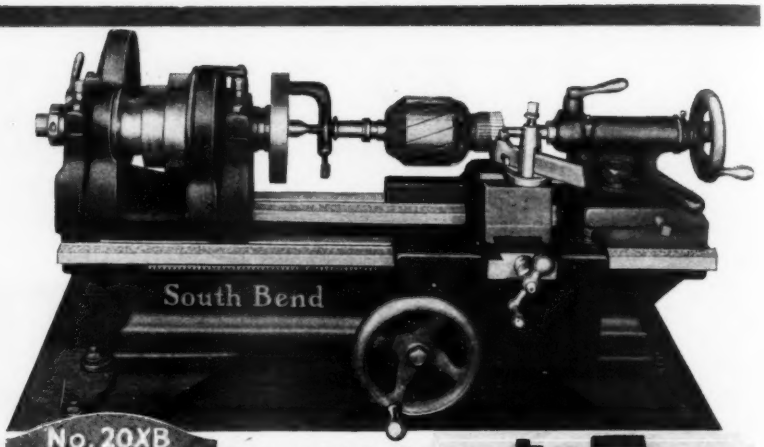

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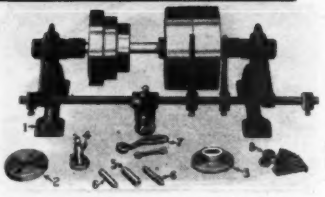

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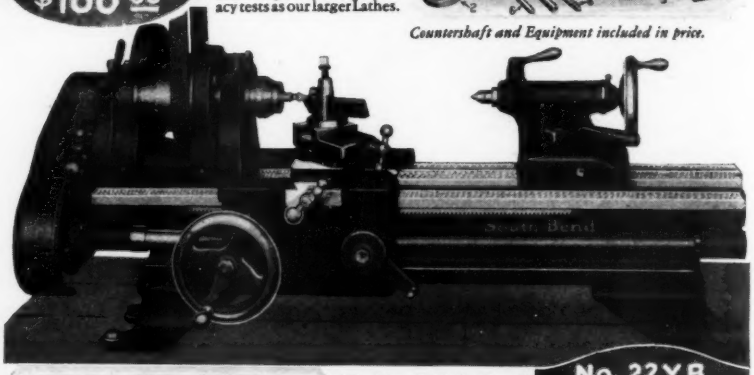

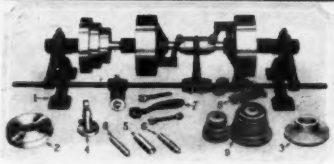

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THESE two Lathes make it possible for every school shop to become equipped with Lathes. The small Lathe is just as good, if not better, for training the boy than the large Lathe. It is easier for him to operate and understand.

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Second—To use the smallest space

Third—To make the lowest investment in equipment.

Write for Bulletin No. 22S describing these Lathes in detail.

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South Bend Lathes

Vol. XV
No. 11

INDUSTRIAL-ARTS MAGAZINE

November, 1926

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Discharging A Debt

Theodore Roosevelt only repeated an age old saying when he declared that "every man is a debtor to his profession." The shop teacher quite as much as the university professor can contribute to progress in industrial education and industrial arts, and this is a duty which he owes to the important profession which he is practicing.

One ready means of aiding progress in school shop work is through the publication of the teachers' ideas in the educational press where they may be brought to the attention of a wide circle of readers. No better means exists for making known new teaching methods, new problems and projects, new courses, etc., etc.

The editors of the INDUSTRIAL-ARTS MAGAZINE always welcome contributions from teachers. The merits of each article, problem, or news item is the only criterion of acceptance.

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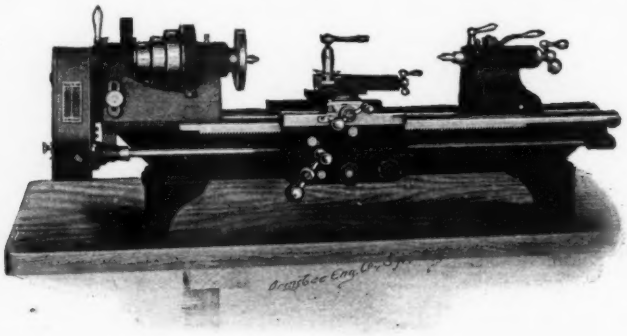
STAR LATHES

USED THE WORLD OVER



STAR LATHES

IN OVER 400 SCHOOLS

TRAINING the BOYS for the SHOP

Note the convenience of using the bench type lathe, plenty table space for work and tools, saving of floor space, storage space under the table and a drawer for tools, etc.

STAR LATHES

BENCH TYPE
10" Swing, 4 to 5 foot Bed
12" Swing, 4 to 7 foot Bed

FLOOR TYPE
10" Swing, 4 to 5 foot Bed
12" Swing, 4 to 7 foot Bed
14" Swing, 5 to 10 foot Bed

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THE INDUSTRIAL ARTS MAGAZINE

Volume XV NOVEMBER, 1926 No. 11

Score Card for Teachers of Manual Arts To be Used for-Self Rating or by Supervisory Authorities

H. W. Schmidt, Supervisor of High Schools and Manual Arts, Department of Public Instruction, Madison, Wis.

THE PURPOSE OF THE SCORE CARD

IT is the general opinion that a rating card for teachers is of greatest value when used as a self-rating device; less so when used by others unless such use is accompanied by constructive discussions and criticisms and when remedial measures are applied. A simple rating score is of little value—it is static. Improvement does not necessarily follow a statement as to scores made; a dynamic attitude is engendered only through a careful analysis of self and a clear recognition of those traits needing improvement. It is conceded that it is worth while to uncover "self-deficiencies" for the primary purpose of improvement.

If this is true, then some objective form of determining relative values along definite lines must be made, and the result is a score or rating card. It is hoped that teachers will look upon such a scheme in the light set forth above and use the card in a fitting manner. Co-operation is not a catch word here, but is intended to convey a real meaning. Without it such an empirical determination is of little value.

This particular score card is the result, in part, of a research problem by a group of summer school students at the University of Wisconsin. It is also based upon the experiences of the author and a number of other educators whose work covers an extended period of teaching.

The weighting of the various items is the median of some forty judgments. It is thus a consensus of opinion and therefore more or less empirical. However, the weighting has been subject to field tests extending over a period of two years, and after some modifications of the original scores, has apparently been stabilized to the extent that judgments based upon the card merit its application both as a measuring device by supervisors and for self-improvement.

The supervisor may find this card of value as an objective device, whose findings will serve as a basis for discussions between him and the teachers. In this way a much better understanding may be arrived at in the case of mooted points. The card thus becomes an instrument for doing real constructive work with the teacher and should be so used.

It may be noted that the specific results of teaching are not a definite part of this score card. There are several reasons for this omission; the principal one is that such results, aside from the obvious mechanical ones, are difficult to measure and to judge, and therefore in the same measure difficult to score. There are a few tests on the market which could be used diagnostically and possibly as achievement measures, but in the final analysis, it may be a difficult matter to come to a definite conclusion regarding the efficiency of teaching as measured by such devices. It must not be forgotten that the results of teaching manual arts are intimately tied up with the aims, and unless the latter are stated much more definitely than usually, it would be rather difficult to be very objective when it comes to measuring results.

Rather is the stand taken that the achievement in the direction of results is very closely related to, and connected with, the various elements of the score card and in a definitely subjective manner. For example, heading IV, Teaching Technique, could hardly be given a high rating and not imply good results. This, taken in connection with the other divisions of the card, may therefore be taken as meaning that a high total score will be definite indications of good results, while the reverse would be true with a low score. The use of the score card has proven this assumption and thus no subdivision on the results of teaching has been incorporated in the card.

NOTATIONS ON STANDARDS

I. Personal Equipment.

This item includes such matters and details which permit one to judge of that quality which is usually designated as "personality." It defines in more objective terms such attributes as dynamic, forceful, weak, resourceful, etc.

A. GENERAL APPEARANCE is that particular bearing or aspect of an individual which gives one an idea of him as a whole, largely physical.

1. *Dress.* Clothes do not necessarily "make the man," but they do influence one's judgment on the score of general appearance. Wearing apparel need not be expensive, but should be quiet in tone, suitable and well kept. Shop dress should be in keeping with the work

A SCORE CARD FOR TEACHERS OF MANUAL ARTS

I. Personal Equipment	**150**			
A. General appearance		33		
1. Dress			9	
2. Carriage			9	
3. Cleanliness			15	
B. Health		38		
1. General			27	
2. Deformities or infirmities			11	
C. Voice		19		
D. Character		60		
1. Enthusiasm			7	
2. Sincerity			7	
3. Self-reliance			9	
4. Initiative			13	
5. Industriousness			11	
6. Tact			13	
II. Social Equipment	**140**			
A. Cooperation		35		
1. With fellow teachers			16	
2. With superiors			19	
B. Loyalty		26		
1. To school			16	
2. To community			10	
C. Leadership		33		
1. In school			21	
2. In community			12	
D. Interest		24		
1. In school			14	
2. In community			10	
E. Sympathy		22		
1. Towards children			14	
2. With educational problems			8	
III. Professional Equipment	**280**			
A. Educational preparation		56		
1. General			21	
2. Professional			19	
3. Special			16	
B. Practical experience and trade training		30		
1. Application to teaching			19	
2. As a broadening influence			11	
C. Grasp of subject matter		36		
D. Organizing ability		42		
1. In mass			22	
2. Daily preparation			20	
E. Use of English in classroom		22		
F. Response to suggestions		32		
G. Attitude towards research and experimental work		20		
H. Professional growth		42		
1. Study			32	
a. Reading				11
b. Correspondence				5
c. Attendance at educational institutions				16
2. Membership in organizations			10	
IV. Teaching Technique	**250**			
A. Clearness of aims and objectives		63		
B. Presentation of subject matter		75		
1. Organization			17	
2. Presentation			22	
3. Discussion			16	
4. Application			20	
C. Thought stimulation		50		
1. Motivation			20	
2. Projects			19	
3. Recitations			11	
D. Integration		34		
1. Summarizing or "clinching"			21	
2. Related subject matter			13	
E. Attitude towards individual Differences		28		
V. Shop Management	**180**			
A. Discipline		36		
B. Attention to hygienic conditions		22		
C. Alertness of instructor		22		
D. Class routine		19		
E. Shop organization		81		
1. Orderliness			14	
2. Cleanliness			12	
3. Condition of tools			20	
a. General				9
b. Individual				11
4. Condition of machinery			16	
a. Arrangement				3
b. Upkeep				7
c. Safety				6
a. Arrangement				7
b. Records				5
5. Care of supplies			12	
6. Use of industrial and material exhibits			7	

TOTAL SCORE

1. Personal equipment	**150**
2. Social equipment	**140**
3. Professional equipment	**280**
4. Teaching technique	**250**
5. Shop management	**180**
Total	**1000**

in hand. Shop procedure should never be used as an argument for wearing objectionable garments.

2. *Carriage* refers to general bodily bearing: an erect posture, alert bearing and assured manner are desirable. Walking with a slouch, or with hands in pockets, does not command respect.

3. *Cleanliness.* This refers to bodily cleanliness, as well as that of the clothing, which should be kept as clean as may be. The fact that shop contact with objectionable material may be necessary is no reason why the signs of such contact should be carried about indefinitely.

It may go without saying that bodily cleanliness as that of face and hands, teeth, pure breath, freedom from body odors, etc., should be such that it is not necessary to call attention to it. Observation has shown, however, that comments in this direction are not amiss.

B. HEALTH. Condition of health is rather important and may often interfere seriously with the conduct of work or influence it materially, for either good or bad.

1. *General health.* This refers especially to diseases or their absence; it is to be taken for granted that a teacher should be hale and vigorous in body as well as in mind, and the objective may readily be stated as a healthy body, not merely the absence of disease.

2. *Deformities or infirmities.* Certain infirmities, as well as deformities, interfere with class work. These

should be taken into consideration in rating teachers. The loss of bodily members, poor eyesight, defective speech, as well as hearing, are among those likely to affect teaching efficiency. Those defects which cause a repulsive or revolting appearance are apt to react unfavorably upon the student, and result in inattention as well as inefficiency in learning. Fortunately, such defects are not common among teachers, otherwise the original weighting on this item might have been increased.

C. VOICE. A well modulated voice, one which can adapt itself to the various situations arising in teaching work, is a real asset. Too many teachers attempt to discipline through the voice rather than by more legitimate means. A harsh, strident, or loud voice may antagonize the student.

D. CHARACTER. Those distinctive traits or qualities of an individual which lie at the root of his professional and social reaction. The more important ones are listed herewith.

1. *Enthusiasm.* The zeal displayed in disposing of and dealing with the problems of the school and life. It should be qualified by good judgment. Restlessness and jumping from one thing to another, thus dissipating energy, are not to be interpreted as enthusiasm.

2. *Sincerity.* That part of character which denotes honesty of purpose and motives which are not assumed for ulterior purposes or pretense.

3. *Self-reliance.* A "trust in myself" attitude which is tempered by an ego-less attitude of mind. It permits a teacher to think along independent lines and further achievement. An individual possessing this trait is sure to follow a problem to a successful ending.

4. *Initiative.* The ability to inaugurate procedure whose ends are recognized, especially those which lead into new fields. It often necessitates "constructive thinking" and calls for a type of mind which is able to appreciate remote ends.

5. *Industriousness.* This is not to be interpreted as "work," industrial or mechanical, but rather as the ability to make the most of one's time. It applies equally well to thought processes, formulating of new projects, or teaching technique.

5. *Tact.* This is a positive attribute of character which permits an individual to react, both in speech and action, in a manner suitable to the occasion and as circumstances warrant. Its absence is quite likely to lead to unpleasantness and friction. Its presence is among the most desirable of character traits.

It may be stated here that probably no part of the score card is more difficult to interpret and pass judgment upon, especially as regards the teacher himself, as the above six items. Careful scrutiny and investigation on part of the observer is needed: Introspection on the part of the teacher who is attempting to rate himself is most necessary. Rationalization must be guarded against. The term of "honesty" has been omitted from the above items for obvious reasons.

II. Social Equipment.

Though no definite cleavage exists between personal equipment and social equipment it is thought best to list certain qualities under the latter head, especially if we think of them as those attributes which permit one to mix freely with others in furthering social intercourse and social aims.

A. CO-OPERATION. A good teacher must be willing to co-operate with others in the development of the school as a whole; he is in the school and must be an integral part of it.

1. *With fellow teachers.* There is somewhat of a tendency for teachers of the special subjects to hold rather aloof from their fellow teachers when it comes to general educational problems or discussions. There is no good reason for this, and willingness to share in the various movements going on in other departments, or in working for the solution of general problems is to be desired.

2. *With superiors.* A similar helpful attitude should be displayed toward those in authority, and such a spirit will help much to bring about a good understanding between teacher and superior.

B. LOYALTY. This trait must be outstanding if the individual is sincere in his work. A faithful allegiance to the principles laid down by authority is to be commended.

1. *To school.* It would seem absolutely essential that one uphold the principles and traditions of his school. Honest disagreement may at times be justified but never made the topic of public discussion.

2. *To community.* Through pupil training the teacher is helping to build the community and shape its opinions; in this measure he is responsible for its destiny, and loyalty to it must therefore be in evidence. Otherwise his attitude would be hypocritical.

C. LEADERSHIP. This does not mean to lead in everything nor to push oneself forward; rather does this term concern itself with the ability to lead in, or be a part of a forward movement along some worthy line. Teaching is not all done in school—leadership by the teacher is a part of extra-curricular activities.

1. *In school.* The teacher is fortunately situated in this respect. His is the guidance in many cases and his lead means much to his students. He becomes an example.

2. *In community.* Due to his position a teacher is often brought into contact with his fellowmen and his opportunities to assume leadership are many. His training should have fitted him in part for this. He should not shirk the responsibility.

D. INTEREST. The teacher's interest in his work should be self-evident and outstanding. He should treat his work of teaching as a vocation, not an avocation.

1. *In school.* The interest should not only cover the teacher's own field, but should be extended to include that of the school as a whole and its various special activities.

2. *In community.* This applies to the activities and problems of the community, secular and religious, civic as well as social.

E. SYMPATHY. It is necessary to see the other fellow's viewpoint if one is to excel in any line of endeavor. A mutual feeling of understanding one another is vital in the work of a teacher.

1. *Towards children.* A sympathetic attitude toward the child and his problems. Children respond to sympathy as well as adults, and in many cases the former open their inner shrines to the teacher, rarely opened in any other way. It is a rare opportunity for the teacher.

2. *With educational problems.* Education is dynamic, not static; a trite statement which, however, needs to be reiterated. The teacher's attitude toward educational progress must be sympathetic and receptive, if he is to advance. The "brick wall" may not be tolerated in teachers.

F. ABILITY TO MEET PEOPLE. Last in the list, though not least, is the above caption. Our modern social complex calls for active participation in its problems by the individual. It thus becomes necessary for a quasi-public official to be able to meet people in a gratifying manner. Furthermore, community problems are now a part of school problems and a teacher is in a position where he can help solve those problems, or influence others in desirable directions, through personal contact. (To be Concluded)

The Myth of Colonial Isolation

Edmund M. Littell

FURTHER the Lord hath been pleased to turn all the wigwams, huts and hovels the English dwelt in at their first coming, into orderly, fair, and well built houses, well furnished, many of them." So wrote one Edward Johnson in 1642 in a book "Wonder-working Providence of Sion's Saviour in New England."

The general impression of the Colonist includes as a somber background, uncomfortable homes of little color, barren and desolate and removed from the benefits offered by their home land. Looked at from the point of view of modern plumbing and generally excessive heating, they may indeed have been a suffering people. But, since they had never enjoyed such comforts in their Old World homes, they were not aware of any such privation. On the other hand, they were able to surround themselves with color and brightness with almost the same facility as their friends "back home."

FIGURE 1. PARLOR OF THE HART HOUSE WITH A PURITAN GRANDMARM WEARING A COSTUME (COPIED FROM OLD DOCUMENTS) TYPICAL OF DRESS OF THE MIDDLE OF THE SEVENTEENTH CENTURY.

Evidence to this effect has been found repeated many times in wills, inventories, and advertisements. The third person executed for witchcraft in 1656, the widow of a merchant in Boston, beautified her home with a "green say cushion, a violet pinckt cushion, a velvet and wrought cushion with gold," in addition to cupboard cloths, valances, and painted calico curtains from India, painted with the design of the Tree of Life. In 1663 Samuel Pepys records in his diary that he purchased for his wife "a chint, that is a painted Indian calico, for to line her new study." Proving that even in those days the tide of commerce brought to these shores, as well as to Mother England, the little luxuries which add so much to home surroundings.

Very tangible proof of such a condition is given in the new American Wing of the Metropolitan Museum opened to the public a few years ago. After a period of fifteen years of research, a representative collection of furniture, ceramics, glass and textiles has been gathered and arranged in original rooms of their period,

FIGURE 2. WOODWORK FROM THE POWEL HOUSE BUILT IN 1769.

The painted wall paper is Chinese. The mahogany furniture is in the Chippendale style and was made in Philadelphia after 1775. The portrait on the mantel is a Coply, painted in 1769.

FIGURE 8. THE BALLROOM FROM GADSBY'S TAVERN, ALEXANDRIA, VA. THE HANGING BALCONY IS AN UNUSUAL FEATURE.

making it possible to re-create the atmosphere of typical interiors of the seventeenth and eighteenth centuries. A total of fifteen rooms, three galleries and two alcoves furnishes a conclusive demonstration that the people of those times were not suffering for lack of the comforts of their lands.

One of the photographs here shown is that of the parlor of the Hart House (1640) at Ipswich, Mass. It was not possible to secure this original room, so it was carefully reproduced, as was one other early room. Both of the originals are still in existence. The Puritan grandmarm is shown in the dress of the time, as well. The massive carved furniture of the room includes a chest, and a desk-box which indicate the comfort which surrounded the early settlers. Rooms of that time were more crowded with furniture than this, but that is considered even in these days as the height of comfort. Velvet and damask cushions, curtains and valances and bed hangings of painted calico added the necessary touches of warmth to the room. The rush-bottomed chairs were completely altered both in appearance and comfort by the addition of a cushion of some bright color. Around the fireplace wall can be seen a band of decoration, an effective use of dentils cut from a moulded board. On them is introduced colors—red and black—of which traces remained when the original room was renovated some years ago. This is the earliest recorded use of color in American architecture.

Most of the draperies and textiles of those days were imported, since the weaving done in the Colonies was of utilitarian nature, but it is evident that such finishing touches were available at all times. New England cabinet makers soon provided locally made furniture, and silversmiths began to offer their wares from the first. Commerce with the Old World and the West Indies increased rapidly, until in the early part of the eighteenth century the town of Boston was described by David Neal in The History of New England (1720) "....so that a gentleman from *London* could almost think himself at home in *Boston,* when he observes the numbers of people, their houses, their furniture, their tables, their dress and conversation, which perhaps is as splendid and showy, as that of the most considerable tradesmen in *London.*" Inventories, diaries, correspondence, and newspaper advertisements of those days list freely calicoes, both painted and printed, linens and damasks, velvets, muslins, and serges. Portuguese imports were heavy enough to draw complaint from merchants who sold English goods.

Mezzotints and prints were used for the walls as well, though the fact that they were framed without glass caused them to rot away, the victims of exposure. One large well preserved print dated 1720, shows New York from the harbor, indicating the influence of Dutch and English schools of architecture.

Paint as an interior decoration was not used considerably until the eighteenth century. "Pearl and cream color" were ordered by the council in 1727 for the "Great Dining Room and Parlor thereto adjoining" for the Governor's Palace at Williamsburg, Va. In 1738 the first Yale College building was ordered to be painted "a bluish or lead color." In 1748 a New York visitor noted that "the alcoves, and all the woodwork were painted with a bluish grey color." It was not until

the days of the early republic that shades of white became fashionable, especially in rooms where the Adam style of decoration was featured, as white enhanced the play of light and shadow and brought out the detail of ornament in relief.

Wall papers of elaborate design were imported and used in the first quarter of the eighteenth century. Chinese patterns, English papers, and not infrequently textiles were used as wall coverings, providing a colorful background for the furniture of the period. Thomas Hancock of Boston, uncle of John Hancock, in 1738 ordered from a London stationer a certain wall paper which he described accurately, indicating in his letter that there was a vogue for this type. "....a great variety of different sorts of birds, peacocks, macoys, squirril, monkys, fruit, and flowers," he says, and "I think they are handsomer and better than painted hangings done in Oyle."

FIGURE 4. BEDROOM FROM THE EAGLE HOUSE, HAVERHILL, MASS. FURNITURE OF SHERATON TYPE.

As years passed and great prosperity came to the Colonists, they surrounded themselves with beauty to an even greater extent, as is well known. This is indicated by the advertisement of one John Webster in Philadelphia, to the effect that he "begs leave to acquaint all ladies and gentlemen, and those who shall please to employ him in the upholstery business" that he is able to execute in the newest taste "sophias, couches, canopies, and canopy-beds, French elbows, stools, chairs; rooms hung with paper, chintz, damask or tapestry." He had recently arrived from serving the "gentry and nobility" of England and Scotland.

The room from the Powell House in Philadelphia is an example of the furnishings of that period. It was built in 1768, and is intimately connected with the personal life of George Washington, who made it his headquarters after the British evacuation of Philadelphia, the Earl of Carlisle having used it during their occupation of the city. Washington also visited there many times during the time the Constitution was being framed. This room shows the finest architectural treatment of the time, and the furniture is all Philadelphia made. The brocade gown worn by the hostess, as well

FIGURE 5. CHARLES ALLEN MUNN ROOM, PHILADELPHIA. EARLY NINETEENTH CENTURY.

as the tea service, is of the same period. The room is hung with yellow damask curtains, fashioned in the same manner as ordered by William Franklin, son of Benjamin, in 1763. The chandelier, of lustre, is of English manufacture; the elaborate plaster work is colonial.

Perhaps the most striking room in the entire three floors of the wing is the ballroom from Gadby's Tavern, Alexandria, Va. Built in 1793, this room displays a beauty of architecture and furnishing which defies description, and exemplifies a style of an earlier time. The woodwork is painted a light grey-green which lends a softness to the room hard to appreciate from a photograph. This room is of great interest historically as well, for Washington attended his last birthnight ball here in 1798. Lafayette's first association with the room was at a public dinner given him in 1824, and Robert E. Lee, still a boy, was marshal in the long procession of revolutionary personages which preceded the dinner. Gilbert Stuart portraits are hung in this room, a most satisfactory setting for the work of America's great native born portrait painter.

Through the door in the end of the ballroom can be seen a glimpse of a room from Marmion, Prince

FIGURE 6. ROOM FROM "MARMION," KING GEORGE COUNTY, VIRGINIA. EARLY EIGHTEENTH CENTURY.

George County, Va., the historic estate of Philip Fitzhugh, owned in the last part of the eighteenth century by George Lewis, nephew of Washington and commander of his bodyguard.

The Metropolitan Museum has in every case, even to that of the textiles, used materials of the times in each room. Exhaustive research has furnished the authority for each installation, and the exact atmosphere has been re-created in each room with a fidelity that is very impressive. The development of home comforts has been shown with great accuracy, showing that the general impression of colonial discomfort is no more the case than would apply to the Old World. As rapidly as new luxuries were discovered by the merchants of the Old World, they were introduced, and adopted, by the colonists—sometimes even sooner, it might be judged. The rapid increase in the wealth of our settlers doubtless enabled them to enjoy greater comforts than the Old World people, when considered pro rata. Until, while we did not have the elaboration of court functions, our ceremonies were as colorful and striking as those across the Atlantic, our mass of common people tasted a comfort of home life which made freedom even more desirable.

A Grading Method for Manual Training Classes

Norman C. Tock, Instructor of Printing, Creston High School, Grand Rapids, Mich.

SHOP work includes so many factors on which the pupil should be graded that the busy instructor is often unable to devise a system of grading that will make provision for all the attainments which the pupil is expected to make. In the present article some conclusions are presented, which the writer has reached after ten years' experience in the use of various marking systems. Some suggestions are also made for a system of marking which will be satisfactory in almost any line of industrial arts teaching.

Whatever the method used in checking up or grading a pupil, it must, in order to be effective, reduce the great variation in kind and difficulty of projects, and the quality of work to some common denominator. Variation is inevitable in manual training, for after the first preliminary problems are out of the way, the pupils in most shop classes are permitted to choose their own projects. The instructor's problem arises when he attempts at the end of a grading period to rank the pupils and to grade them according to the work turned out. One boy has made a stool and started a bookshelf. How shall his work be graded in comparison with the work of another boy who has spent all that time in getting out the stock for a larger project, such as a table? The resulting grade would need modification because of difference in the quality, and still further modification because of the greater self-reliance, cooperation, and better care of the shop which one boy exercised. A grading system should reconcile and evaluate all these varying factors and translate them into grades.

Many of the grading systems in use can not so evaluate and reconcile these factors. Even the painstaking daily grade system proves unsatisfactory because of its great subjectivity. On the other hand, the practice of grading only on finished work results in neglecting such important items as good planning, self-reliance, industry, and proper shop habits. Some happy medium between the two must be found, which can be made to check up all the abilities the instructor is trying to develop, and in the right proportion, emphasize them.

Whatever the ultimate aim in a course may be, the grade given a pupil is based on the work he turns out. By his work the teacher can measure his ability to do a reasonable amount of work, his ability to do that work well, and his ability to form correct habits of shop behavior. These measurements do not need to be absolute, but can be based on an average or norm. With the proper measuring stick the achievements of one pupil can be compared with the work of his fellows either in one ability or in all. By varying the proportionate credit given for the different abilities the teacher can place the emphasis where he wills.

One grading system which provides such a measuring stick is a system which gives points for the completion of a unit, for making the work reach a certain standard of excellence, and for the display of good shop habits. That is a brief statement of the system here advocated. It has the advantage of being objective, being based on the pupil's work rather than on the teacher's judgment. It is positive, since it gives credit instead of cutting grades, and once the scale of points is worked out, it is surprisingly convenient. The pupil knows his position in respect to the other members of his class and works to keep his position favorable. The greatest recommendation, however, for such a system is the way in which it checks the abilities mentioned in whatever proportion the instructor wishes, for it makes provision for variation in projects, variation in difficulty of projects, and variation in the quality of the work done. It is applicable to almost all lines of shop work, though the examples given in this article are based on woodwork.

Another important feature is the way positive credit is given for shop habits, which is merely another way of saying that it helps in the development of shop character. Only such habits should receive credit as cannot be measured by the grade given for amount and quality of work. For instance, attention is measured by the quantity and quality of the work done, for attention, or the lack of it, will seriously affect the work turned out. The instructor can in the same way include conduct, neatness, accuracy, and the like. On the other

hand, self-reliance, cooperation, care of tools and shop, or the reading of outside references would need to be given separate credit.

With these preliminary considerations stated, it is possible to plan a tentative scale of points which each teacher will expect to revise after he has used it a while. As a first step it is necessary to decide upon the emphasis to be placed on each of the three abilities mentioned above. In woodwork, quantity and quality are about equal in importance, and about twenty per cent of the grade should depend on the shop habits of the pupil. Thus quantity and quality will make up 80 per cent of the grade.

Second, a project may be selected which will be finished by the average pupil during one grading period of a month, five weeks or six weeks, whatever system is used in a given school. Suppose that it is decided that a certain type of taboret will take just about that long for completion, and that getting out stock will take half of that time, making joints one-fourth of it, assembly one-eighth, and finishing one-eighth.

Next a sort of chart may be devised on which are listed all the usual projects made in the shop. There will be a number of modifications for each project that do not need to affect the chart. Let the chart take care of the fundamentals and the modifications can be taken care of later. The projects will be worked out on a point basis according to the basic problem. If a project takes twice as long to assemble as the basic project, it is listed with twice as many points for assembly, and so on. The chart will probably look something like this:

Project	Getting Out Stock	Joints	Assembly	Finish
Taboret	50	25	12	13
Bookrack	10	20	10	10
Table	150	200	50	300

When the pupil has his stock ready the teacher checks it for quality. For reaching a certain standard (say all pieces to be within a thirty-second of an inch of the right size), a number of points equal to the points given for getting the stock out are given. If the work is poorer, fewer points are given. Then the teacher tells the pupil what to do next, makes a record of the points given and goes on to the next pupil. No time has been wasted because the teacher has done the grading at the same time as he checked the pupil's work, an operation which he would have to perform in any case.

At the end of the month the sum of each pupil's points is found and the pupil's record credited with his character points. According to this particular scale two hundred points is the average for quality and quantity, so twenty per cent of that or forty pupils are given for the display of proper shop habits (less than that to the pupil who has needed more than the usual help, to the pupil who has worked with dull tools, dropped his plane, or failed to keep his bench in order, and so on).

Then the pupils are ranked, each in his own group, the one who made the most points at the top, and the one who made the least points at the bottom. According to the place in the list, each pupil is then given a grade. As a rule the highest pupil in the class would receive an "A" while the poorest pupil would be "failed." There will be no need to explain to this last individual why his grade was so low.

It is suggested that the record be kept with a special colored pencil which does not leave the teacher's possession, and that the record be accessible to the pupils. Points should be given on as small a unit as possible in order to keep a closer tab on the work and to prevent the passing of the grading period with some pupil getting no points.

The grade should be given before the pupil makes corrections indicated by the teacher, thus forcing the pupil to rely upon himself and his own judgment.

This system is slightly more complicated than many of the haphazard methods in use today. However, it is felt that it is much better to use a slightly complicated system than to use snap-judgment. It is no more time-taking than any careful system, for what little extra time is taken in the grading is saved by the decrease in teaching load. Every boy realizes that he must "keep on his toes" and work if he is going to forge to the front. He knows which points are emphasized, which mistakes to watch for, and how he is expected to conduct himself. All this lightens the teacher's load, for one of the most fatiguing of the teacher's duties is that of spurring onward the laggards of the class. With greater effort on the part of the pupil, which comes from positive crediting of work, the teacher is relieved of much of this burden and can put his energy to work on instruction.

There is another advantage in a definite system of grading which is not lightly to be passed over. It is the standardization of the passing grade. By comparing the work of pupils with the work of a previous class, and by watching the records over a period of years, it is possible to so standardize the grading that the teacher can set a point below which he will not pass a pupil. The present rather vague passing line results in many pupils receiving credit for poor or mediocre work in manual training. Many pupils who are too lazy to pass in academic subjects, take manual training because they feel sure of passing if they behave themselves. The development of a definite grading system will help obviate this attitude. Not that it is necessary to "fail" a certain number of our boys before the instructor can feel that he has successfully taught a class, but that a definite goal is needed, which can be set up before pupils as a passing point for the year's work.

Such a stiffening of requirements will bring a greater respect, both from those of the profession and also from pupils. Those who grade pupils in a careless, snap-judgment fashion owe it to their profession to mend their ways and adopt a more exact and satisfactory system.

Accident Prevention in School Shops

James K. Shallenberger, Brighton, Colo.

(Sixth Article)

THE MACHINE SHOP

The primary purpose of these articles is to present the dangers of the school wood shop rather completely, together with some means of eliminating those dangers so far as may be, yet it seems advisable to add here a brief discussion of the machine shop and its attendant dangers. These matters will be treated in a somewhat different manner because, with the latter, brevity is sought and because treating each separate machine does not seem applicable to the machine shop without an excess of repetition. Further, the hazards inherent in the construction of the shop, the arrangement of the machines and shafting and the like have already been treated and apply without essential change to the machine shop.

There seem to be no statistics available on the relative number of accidents which occur in the school wood shop and the machine shop. Several rather exhaustive investigations have been made in the commercial field, but there are several factors that vitiate any attempt to interpret them for our use. The great complexity of machinery, jig work, and forced output does not exist in the school shop. There are in addition several social and economic features, such for instance as fatigue (in the psychological sense), that have a distinct bearing on the distribution of accidents. The lack of these elements in the school invalidate the figures for use in this discussion.

If such statistics were available it is very likely that they would show a considerable preponderance of serious accidents in the wood shop over the machine shop. Wood working machines are operated at much higher speeds and the cutters are frequently obscured from view. The material is generally fed by hand, and the saw, in particular, breaks far more frequently and with greater danger than any tool in the machine shop.

The general method of conveying to the student the knowledge of the dangers discussed here should be the same as is outlined in the previous papers, i.e., by instruction, followed by questions and answers to make sure that the boy really understands.

Bench Work

The bench work in the machine shop does not offer chances of serious accident except to the eyes. The tools for the most part are not so sharp and are not used with the same dangerous motion, as for example, the chisel in the wood shop. There are, however, a few potentialities worth consideration.

Chipping and *punching*. The dangers of chipping are threefold, but only one is likely to result seriously. The chips are likely to fly away from the workman, in which case they are more dangerous to another near-by workman than to the operator. This should be considered when the boy is given his station at the bench. There are times, however, when precision is demanded, so that he may stoop down to watch the effect of his tool. This brings his eyes in range and when such work is likely, he should be required to wear glasses.

Another danger of this same sort is the improper tempering of the point of the punch or chisel. If it is too hard and the edge is brittle, a smart blow of the hammer is likely to break off points of metal. If his face is down, as it would be while placing a punch on center, the chip may fly with considerable force to the cheek or eye.

When the workman is inexperienced in chipping, he will probably hit the lateral surface of the left hand often enough to have it thoroughly bruised, and may even get a mashed thumb. This sort of thing is painful but seldom serious. Application of lead and laudanum to the injured member will offer considerable relief.

Another rather rare minor injury is occasioned by using a chisel or punch where there is not comfortable clearance for the left hand, when holding the chisel, or perhaps for the right hand in swinging the hammer. Under such conditions, an ill-directed blow of the hammer may cause the tool to pinch the hand between the chisel and the casting. Skinned knuckles are painful and can frequently be avoided by assigning the job to an experienced workman or indicating the danger when the job is assigned.

After steady use, the butt end of the chisel or punch becomes mashed down. The burrs break off from time to time and fly with force. To avoid this the tools should be kept dressed.

There is a real danger in the use of the anvil other than the occasional mashed finger. If a clean anvil is struck with a ball-peen hammer, the rebound is so quick and forceful that it would fell any student whose head happened to be in the way of it. The real danger lies in the fact that under heavy blows, a miss will rebound from the anvil too quickly to be dodged and is always unexpected. This danger should be illustrated so that the student will keep his head well out of the way of a kick-back from the hammer.

The Abuses of Hand Tools

Most hand tools used in the machine shop are of such rugged structure that they are not subject to much abuse, but there are a few that the thoughtless student may injure by ignorance or indifference of their proper use. A brief of these may recall to the instructor some admonitions that would be timely when they are first issued to the new student.

1. Micrometers are not clamps but delicate measuring instruments.
2. Dividers and scribers are not to be used to play mumblety peg on the bench.
3. The try square is neither a hammer nor a screw driver.
4. One cannot make a piece of steel smaller by tightening a pair of calipers on it.

5. If a wire will not go into a wire gauge, it is because the wire is too big; the gauge is correct. The same is true of any standard gauge. If the stock will not fit the gauge, the piece is too big, and forcing the gauge on the piece will not change anything but the gauge.

Oiling and Adjusting Power Shafts

No student should ever be allowed to do any work on a powershaft while it is running. If this is attempted, the workman standing on a high step ladder, not only takes the chance of losing his balance on so insecure a perch and falling into the drive system, but he is in danger of being jerked off his feet by having an oil can spout, or a wrench, foul in the rotating elements of the line shaft. Sometimes this sort of thing may be done safely on a countershaft, by throwing the belt on the idler and tying the belt shift. Even on countershaft work the parts should be well isolated from any rotating pulleys or belts.

Ladders

Step ladders should be securely built with safety feet and good, spread braces. A flimsy ladder is always a potential danger and should not be tolerated in the shop. The instructor must assume responsibility when such a one is used.

The Machines

The machines in the metal working shop do not lend themselves to the question-and-answer method that has been used for the wood shop because the dangers to the operator on each of them are so similar that individual treatment would make for tedious repetition. The diversity of appliances used on them prevent full treatment here and are subjects more for instruction in their functions than in caution.

For these reasons the discussion is grouped to cover all of them as much as may be in the belief that such a single group of questions and answers will transfer easily from one to another. Where this cannot be done there is some individual comment in later paragraphs. The reader may easily transform this general treatment into separate catechisms if he deems it expedient.

1. What precautions should be taken before throwing on the power?

Adjust the tool so that it just clears the work in the position of the first cut, and then turn the machine over by hand through one complete cycle to see that the tool, arbor, and the like, clear all bolts, vise, dogs, etc.

2. What are the dangers to the operator?

(a) *Clothing.* If overalls and jumper are used the jumper should be tucked in the bib so that there can be no chance of its loose folds being caught in table or other moving parts.

Gloves are not to be worn. They deaden the tactile sense and endanger the hand if caught. Some fastidious youths try this expedient to keep clean nails, but the practice should not be tolerated.

Neckties other than bow ties are dangerous.

Rings are dangerous because the workman frequently puts his hand on the moving stock, a thing in itself dangerous, and runs the chances of some protruding corner fouling the ring.

(b) *Gears* when exposed are dangerous and if the design of the machine does not permit their being guarded, their location should be pointed out so that they may be avoided. No attempt should ever be made to clean them while they are under power.

(c) *Chips, shales,* and *shavings* are razor edged and they should never be broken off with the hand. In the case of the miller, shaper, and planer, a brush should be used and on the lathe or drill press the shale may be broken by slipping the feed for one revolution or avoided to some extent by changing the rake of the tool.

(d) *Waste* has many legitimate uses in the shop, but it is not one of them to use it in wiping moving machinery, mounted stock, or any stationary parts where there is the slightest danger of the hanging ends being caught. If the waste fouls in the machine, the hand generally goes with it.

(e) *Belts.* Where it is necessary to shift cone belts with the hand, it should be done with a quick push on the "heel" of the palm and never try grasping the belt so the fingers are on the inside.

(f) *Lathe chucks* and face plates. Where these are heavy and are likely to crush the hand if they do not catch, they should be held in the crook of the arm and the head turned over by hand until the thread catches. The same procedure should be used in demounting them.

(g) *Centering work.* Where the center is a bit hard to locate in drill work, or the first cut in other machines, there is a tendency to get the eyes down too close. If the power is turned on at this time, there is danger of the chips coming off so rapidly that they strike the eye.

(h) *Holding work by hand* on the drill press is dangerous unless there is ample leverage against the torque of the drill. Should the piece get away from the operator, his hand will be pulled into the machine.

THE SMELL OF THE WOOD

A. E. Gray, Stockbridge, Mass.

Oh, I like to open the door of my shop;
Each morning anew it elates me.
What incense is there, what perfume so rare
As the smell of the wood that awaits me!
The sunlight of a hundred years is there,
The winds from a thousand hills;
The dews from countless star-lit nights
And the murmur of mountain rills.
There's the breath from rains and winter snows
In the smell of the wood that meets me;
There's the feel of the orient and the jungle breath
In the smell of the wood that greets me.
What matters if others can sail the world round
And view all the grandeur for a year and a day,
I have ever ready a ship to command,
A breath fills the sails and my boat is away.
It carries me back through the years that are past,
Over wide oceans and far-stretching seas,
I have but to breathe and my journey's complete
I've traveled the world, though I sit at my ease.
Oh, the smell of the wood, what magic it holds,
(What treasures are ours oft least understood),
Though the walls of my shop encompass me round
I can sail far away on the smell of the wood.

Attaining the Objective in Drawing

Towne R. Abercrombie, Ironwood, Mich.

A COURSE in drawing for ninth and tenth grade boys, that meets the requirements of such a course, namely, to develop the power of visualization; to train in exactness of thought and action; to strengthen the construction imagination, and to teach the correct method of reading and writing the industrial language, appears to be a difficult task. There seems to be no particularly standardized method of teaching the subject to gain the above named objectives, and there is such a great variety of materials to work from that one rather hesitates to adopt any one outline of work as a basis of a standard course until actual production has proven it a course that meets our need.

In our drawing courses, to which we perhaps allot more time than the average school, we have a well defined, practical, proven outline of problems, and use a method of presenting these problems which, correlated with the actual problem, gives us the objective toward which the school must work.

Below is a brief of the outlined course for the ninth grade, including the average time involved, and the type of work which serves as a basis for the problems:

Sheet No.	Time	Problem
1	180 minutes	Lines
2	135 minutes	Projection
3	135 minutes	Projection
4	270 minutes	Projection
5	180 minutes	Cross Slide
6	180 minutes	Lever
7	180 minutes	Bracket
	Sheet Metal Drawing	
8	135 minutes	Butt miter moulding
9	135 minutes	Return miter moulding
10	135 minutes	Three piece elbow
11	135 minutes	Dome and boiler
12	135 minutes	Angular flange
13	180 minutes	Oil pump head
14	90 minutes	Chimney top
15	135 minutes	Transition piece
16	180 minutes	Three-way ell
	Mechanical Drawing	
17	135 minutes	Shoe
18	135 minutes	Bracket
19	225 minutes	Flange
20	270 minutes	Face plate

This course is designed for a ten weeks' period, giving ninety minutes per day, for the entire period.

For our tenth grade work we rely solely on machine drawing problems, using a gasoline engine which is made in the machine shop, as the basis for the course. This gives a concrete, practical, step-by-step undertaking that meets the need in the best possible way.

In connection with our regular outline of work, we add supplementary problems of the same nature and give a great deal of time to sketching which we consider one of the really important phases of our work.

Our method of correlating the sketching work with the actual production comes as a natural sequence in the work. For the first plate, which is drawn by tenth grade boys, a copy or blue print is used as reference, coupled with blackboard demonstrations. For the second plate, the boy is required to make a free-hand sketch of the actual finished product; he then uses his sketch, together with a blue print, in the completion of the drawing. The third problem requires a sketch, properly dimensioned, and is the sole means of acquiring information, other than from demonstrations, and for the fourth plate and thereon, each boy makes a sketch, dimensions it, and then exchanges with another member of the class and works from the sketch he received in the exchange.

This method, we have found by experience, is the most satisfactory way of "training the hand and eye to see, and to represent clearly, form and proportion." By the exchange of sketches we are enabled to give sound, practical experience in checking.

It is contended by some instructors that sketching should be given before actual drawing work begins. It has seemed that it would be as practical to give a course in composition to a class who had never seen an alphabet, as to one in sketching, with a view to using the knowledge as a foundation for actual mechanical work, to a class who has not seen, or made a drawing. The actual making of a drawing from demonstrations or from copy of some kind, establishes a foundation in balance, proportion, and general aspect of a completed piece of work. This can not be accomplished from a sketch, nor can a sketch be made that contains these elements, until after at least one drawing is made from another source than sketching.

Our work in ninth and tenth grades consists solely of pencil drawing. This requires a better technic on the part of the pupil, develops a sense of neatness and exactness, which we do not feel can be developed by inking in the plates upon completion with pencil. Our only work in inking in ninth and tenth grade is the making of two or three tracings in the tenth grade, which serve as a basis for further inking and tracing in the eleventh and twelfth year work. Further than this, we see no advantage in inked drawings, but do see a disadvantage in that inking tends to destroy the finer type of execution which we are seeking.

We feel we have attained our objective in drawing work through the means given in this article, namely, a standardized course and a presentation of this course which brings about a gradual, yet definite result.

VALUE OF ART EDUCATION

In teaching a child to create, to appreciate something artistic, whether it be a picture, poster or design of any kind, we add a priceless gift to his life. No one can create, express his æsthetic self in some way or have an appreciation or love for things above mere dollars and cents, without becoming a more useful citizen than he or she would have been had this side of the life been left undeveloped.—Hilda E. Huddle, Columbia, S. Car.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

FALSE ECONOMY

It is proposed to drop auto mechanics, crafts work and dramatics from the list of school subjects taught in one of our large cities.

These subjects are to be dropped to save money for studies that are considered of more educational importance and of less vocational interest.

One of the editorials in support of this economy asserts that it is the first obligation of the schools to educate for citizenship and vocational training is of secondary importance.

No explanations are offered why these particular subjects are vocational rather than educational, or why they are not subjects of suitable study by good citizens.

We can readily conceive auto mechanics taught for vocational results and we can also conceive it taught as part of manual arts instruction without vocational purpose. It is rare in our experience to find boys who have taken auto mechanics or any other mechanics in the public schools able to make vocational use of their skill and knowledge without further work in the trade. They can learn much of mechanical operation that may have educational value and help them in their duties of citizenship.

As for crafts work and dramatics we have similar impressions.

These subjects taught under public school conditions can scarcely be conceived as vocational. The drill and experience necessary to make a successful craftsman or actor can not be given in the limited time devoted to any one of so many school subjects.

The industrial and mechanical and fine arts are the instruments of education for good citizenship. Children are living now in a period when there is more interest in mechanical device and in elocutionary performance and dramatical performance than ever before.

The individual performance in every kind of effort is pronounced by the press. The results of invention are constantly before the inquisitive child. Distinctive performance of every sort is at a premium. The child of a few years ago was sent to school to learn a definite text content by application to a printed text. Now the child is given actual experience with the project in a studio, shop or laboratory.

It is evident that we have too many social and industrial interests to represent each by a separate school course. School courses have multiplied until logical study of the curriculum is necessary and adjustment of many interests under fewer subjects is advisable.

We are under the impression that mechanical interests and dramatic interests are being added rapidly and are considered necessary.

The crafts are becoming adjusted to courses in the fine arts and are perhaps offered less independent of design and composition than a few years ago. This seems advisable.

To eliminate dramatic and mechanical interests from school study as not essential to education for citizenship is a thoughtless and illogical procedure.

THE USELESS KEYS

A little while ago, while rummaging through attics, basements, and mysterious compartments preparatory to a distant move, we came upon a huge assortment of keys of every conceivable description securely and orderly held together by a patented and attractive key ring. There were short keys, long keys, middle-sized keys; thin keys, thick keys, round keys, brass keys, iron keys, and steel keys. It looked as if there were keys enough in that ancient bundle to unlock everything from the kitchen cupboard to St. Peter's gate.

As in all such cases when doubt arises as to whether this or that shall be taken along or consigned to the waste heap, efforts were made to try to find some use for the articles under discussion. Each key was faithfully and laboriously tried on everything about the place that could by any stretch of the imagination be accused of having a lock or any need of one. But to no avail. The keys didn't fit. They were too long or too short or too thick or too thin. In some instances they went into the locks from which all the king's horses and all the king's men could not rescue them intact.

In furtherance of the family plans to pack up and move, our attention was directed to a great mass of textbooks, notebooks, articles, and treatises on manual training, manual arts, practical arts, industrial arts, mechanic arts, mechanical science, and various and sundry other arts. The same questions arose over the disposition of the assortment of arts that had previously arisen over the disposition of the assortment of keys. We tried them on the present-day theories and practices in their respective fields. As the keys did not fit the locks, neither did the assortment of art theories and practices of years past fit into the schemes and programs of the present day. We were made keenly conscious that we are living in a day of rapid and radical changes, of discovery and invention, of temporary adjustments, of artful deceptions, and superficial solutions. We shall be tremendously fortunate, if in this feverish day, we shall be able to find the master key that will not only unlock the locks of time, but shall reveal the mysteries and the truth as well.

INCENTIVE

What is the implication of a general increase in the registration of college students in Liberal Arts over professional courses of study?

Can it be that the youth of our land are becoming thirsty for scholarship and culture and less attracted to professional bread-winning preparation? We have our doubts.

Law, medicine, engineering, agriculture and commerce as college courses of study seem to have reached

the maximum, and the remarkable general increase in college registration seems to be in the colleges of liberal arts study.

One might conceive that the raised standards of professional study in our colleges have become forbidding but the standards have been raised in the colleges of liberal arts as well.

A five per cent increase in attendance is not exceptional in the large colleges and universities this Fall. This is not in ratio with the increase in high school attendance and of course can never exceed high school increase because of entrance requirements.

We have great faith, perhaps unwarranted, in the developing ability of the common schools to establish incentive and choice of vocation in the minds of the boys and girls who complete their school study.

Not that each and every school graduate finds himself with the consuming desire to be a doctor, lawyer or merchant but that they have discovered certain interests in which they take such delight that they can work with zest and persistence.

The college student who is in college just because he is sent by ambitious parents anxious to do by their children as well as their neighbor does by his children is scarcely worthy of parental sacrifice. There is nothing so conducive to success as interest in some particular field of effort.

Can it be that incentive to the study of the liberal arts indicated by increased attendance in the colleges of liberal arts is due to effective teaching of these subjects in the common schools?

We wonder.

THE AMERICAN ASSOCIATION OF VOCATIONAL EDUCATION

It should be the ambition of every person connected with these lines of work commonly referred to by the terms vocational, industrial, and practical, to give every possible support to the new organization known as the American Vocational Association. It was born in the travail of many tears. It marks the passing of organizations that had served worthy purposes. The National Society for the Promotion of Industrial Education rendered a wonderful service in paving the way for the Smith-Hughes law. The Vocational Education Association of the Middle West rendered a conspicuous service in formulating programs and in keeping the national movement for vocational education from localizing itself. While it was at least regional itself, the Middle West Association became the national forum to which came the advocates of the various forms of vocational education from every section of the country, and from which broadened conceptions of the purposes, forms, and methods of vocational education emanated.

All have now merged into the American Association which holds its first meeting in December of this year. There are problems yet to solve. There are new observations yet to be made. The last word has not been said on part-time continuation school. The question of guidance is yet a mystery. The shop training of teachers from the shops are yet far from a satisfactory solution. Numerous other questions are still waiting the final answers. The commercial, agricultural, home economics, trade, industrial, and allied fields of education are combining their forces for a united attack on their common problems. The proper support will render the American Association a fit instrument for the solution of the problems that now face the vocational education work.

NEED FOR VOCATIONAL GUIDANCE

"The need for vocational guidance is everywhere. All lives are affected by it," said W. Carson Ryan, Jr., president of the National Vocational Guidance Association before the N. E. A. meeting at Philadelphia. "Of course there is a viewpoint found of the person who thinks that society or government or somebody should make these choices for us, so that there may be the right number of jobs and people but in a democracy like ours the element of choice must enter. We are still not ready to surrender our precious right to choose our own work in the world, though often economic and other factors over which we have no control will actually make the decision for us. It might happen that we should all want to be artists or musicians or doctors or lawyers, but fortunately or unfortunately society is organized on a basis of more or less definite exchange of services, and will sooner or later decline to finance the occupation into which many people will go.

"Sometimes you professional and office workers complain at the high wages paid to certain other forms of labor, especially of the manual type, but the situation has usually been produced, by the relative lack of people who want to do the labor that is thus highly compensated. As long as the fancy, cleanhand, office job or socially accepted business position makes the greater appeal to the annual army of entrance into industrial life, so long will its financial remuneration be correspondingly low. The schools themselves in some cities have become much more helpful than they used to be in this matter of vocational guidance.

"In a number of public school systems the boy or girl about to leave school will find not merely a placement bureau that will try to put him or her into a satisfactory job but sometimes capable advisors who will tell where further training can be obtained and perhaps even reveal a number of vocations of which the youngster has not even heard. In a good many schools today the youngster will not even have to wait until the school leaving age. All the way along in his schooling, in some cities at least, he will find his studies such as English, civics, history, etc., shot through with ideas and information about the different occupations that make up the modern industrial world. He may even have a course in vocational civics to give him a definite insight into choice of employment.

"Often the young prospective worker is steered not to a job immediately but to further education; for if there is one thing vocational guidance people know it is that the youngster who seeks employment nowadays with the intention of really making a career and rendering service to his generation must have more educational preparation for his work than was necessary when his parents went to work. The father or mother or guardian or friend who lets a boy or girl leave school without a chance at high school, nowadays is practically condemning the youngster to the least desirable and least worthwhile occupations. To make any progress at all, the boy or girl of today must have at least a high school education, or the equivalent in a good vocational or continuation school."

Relationship Between the Training of Foremen: A City Program for Vocational Education

Thomas Diamond, Lansing, Mich.

THE feeling is becoming general that, with few exceptions, all foremen training should be considered a direct responsibility of the local authorities, and hence should be an integral part of the city program for vocational education. The writer believes also that in those cities where the Y. M. C. A., a business corporation, or some other private or semi-private organizations are providing courses for foremen, the local director of vocational education is missing one of the most helpful agencies existing in his city.

Foreman as Teacher

There are many in the field of public vocational education who believe that courses for foremen should be carried on by those charged with the responsibility for training teachers. This has led to a great deal of the work by representatives of the state departments or of the state universities. In most cases this work has been very much worth while; however, it is believed that those departments have no more justification for doing it than they have for providing instruction in the kindergarten.

Those who favor the work done by the state rather than by the local community do so on the ground that the foreman is a teacher and, as such, his training is a responsibility of those in charge of the training of teachers.

No one will contend that the foreman is never called upon to teach, but it is probable that there will be some difference of opinion in regard to the time he spends on this function in relation to the time he spends on others.

So far as the doing part of the job is concerned, the main functions of a foreman are to interpret, direct and supervise. For example:

1. A skilled mechanic would be insulted if a foreman proceeded to teach him how to do a job. He needs some direction in regard to conventions and methods peculiar to the particular factory, but he needs no instruction on how to do his work. In addition to this, the worker may be confronted with some ambiguity in the orders or blueprints. When this occurs, the foreman is the one to whom he applies for an interpretation of the case.

2. If we take, as another example, the routine worker who works continuously on the same operation, we find just as little justification for considering the foreman as a subject for teacher training.

Probably most of the routine operations in the specialized industries can be learned by anyone of average mentality in an extremely short period. This time varies with the job from a minimum of fifteen minutes to a maximum of perhaps three weeks. After the worker has learned to do the job, further instruction on the manipulative processes is usually unnecessary. After the brief teaching period, the principal concern of the foreman is to see that the worker is supplied with material, that the finished work is cared for by the appropriate group, and that prompt action is taken by the repair gang if a machine needs attention.

These illustrations suggest that as far as the doing of the job is concerned, the teaching duties of a foreman are extremely light. As a matter of fact, it is an unusual foreman who must spend more than one hour in any one day on instructions, and one might go still further and say that on most days even this hour is eliminated.

When we turn from the doing of the job, we are likely to find that, while the foreman may not spend any more time on it, his responsibility for training his workers to understand and appreciate the problems that disturb labor is very great.

During the war we experienced a great deal of industrial unrest. Much of this was caused by a lack of understanding on the part of the workers. The problem of educating these workers was one which troubled thoughtful employers for some time, until some one conceived the idea that the foreman, being closest to the worker, was in the most strategic position to teach him those principles which would enable him to understand industrial conditions. It was found, however, that the foremen were just as deficient in their understanding as the workers and consequently had to be taught. This led to an extension of the training to include instruction in the principles of management, and finally to the point where the foreman was being instructed in how to teach his men to do a piece of work.

There still is, and probably always will be, a very great need for training foremen to have an intelligent interest in, and understanding of, the problems which disturb labor. There is likely to be a similar need for providing instruction for them in the problems of management.

Both of these types of instruction may be given by a state representative, but his opportunities are seriously restricted because of his lack of personal contact with the specific problems of the group. It is true he may carry on a course or courses in a community for a limited period, but the discussions are likely to be rather general.

On the other hand, if the work is done by a representative of the local school authorities, he ought to have the time and opportunity to become intimately acquainted with the current specific problems of the factories he deals with, and thus be in a position to make the work more meaningful, and to carry on indefinitely.

Not only is this true, but certain phases of management as well as the building up of the morale of the men by helping them think straight are definite parts of the foreman's job. Consequently, since it is the function of the department of vocational education in any community to prepare a person to enter or to progress in his chosen job, this department is logically responsible for providing the foreman with the opportunity to so prepare himself.

Training Foreman a Public Duty

When we begin to think of the training of foremen as a function of the department of vocational education in a city, the first reason that occurs to us is that it is a duty which the community owes to the foremen. The day has long passed when school people believe that the school is organized for the education of children under 15 years of age. Today the tendency among school administrators is to make the school a center for all the educational activities of the community.

The education provided by the public school authorities in most of our large cities extends from the kindergarten up to and including college work. Commercial training, industrial training, and even correspondence courses are offered in many of our cities. In other words, it has become the policy of the school authorities in our more progressive cities to provide educational opportunities for any group which seems likely to profit from it.

Although this policy is well established, it is unfortunate that the burden of proof in regard to the benefit

likely to result from a new type of vocational work falls upon the director of vocational education. A still greater burden upon his shoulders is to prove that the course will ultimately prove of immense advantage to those responsible for carrying out the whole city program of education. Frequently this task is long and arduous and on many occasions it is given up as hopeless.

It is unfortunate also that there are groups in every community who have not yet become fully aware of the opportunities open to them in the public schools of their city and therefore have never made their needs known to the school authorities.

These conditions have made it possible for various private and semi-private agencies to enter the educational field and supply the demand for courses not being offered in the public schools. These agencies usually draw a heavy toll of profit from the ambitious worker before the public school officials are willing to acknowledge their responsibilities and opportunities.

Aid to Cooperative Courses

Another reason that might be advanced has to do with the growing demand for skilled workers. In many of our cities, those in charge of vocational education have organized cooperative courses in forms varying with the existing opportunities in order to cope with the demand.

As the name implies, these courses necessitate rather a close cooperation between the factories concerned and the schools. The man who keeps the cooperative machinery working smoothly is sometimes called the coordinator.

One of the first tasks of this individual is to secure the consent of the employer in the application of the plan to his factory. After this is done, it would seem that all there remained for him to do is to find the students and set them to work. This might be true if the consenting employer could give the development of the plan his close personal attention, but it is necessary for him to delegate this responsibility to someone who is in closer touch with the boys concerned. Naturally, this someone is the foreman. It is true that there may be intermediary officials, such as the personnel director, or the supervisor of apprentices, but in the final analysis, the one man in the organization who can make or break a plan of this kind is the foreman.

There remains, therefore, the very serious duty of enlisting the sympathy and assistance of this man to whom the boy must report directly. Doubtless, some of the unsuccessful attempts at cooperative work have proved disastrous as a result of the neglect of this precaution, because, as those of you familiar with factory conditions know, any policy established in a shop without the formality of selling the idea to the foreman is likely to fall short of the expectation of its promoters.

Since the success of any program of cooperative education set up by the department of vocational education is directly dependent upon the wilingness of the foreman to lend his aid, those responsible for vocational education must use every possible means to insure his support.

If the foreman has been attending classes or conferences sponsored by the department of vocational education, he will be familiar with the personnel of the department, and will have acquired some knowledge of their aims. Because of this familiarity he is likely to greet cordially any representative of the department concerned with the administration of a cooperative group.

Aid in Apprenticeship

Again, the aid of the foreman is necessary in the promotion of any effective system of apprenticeship.

While apprenticeship is not as common as it was in the earlier history of the country, a number of our more progressive tradesmen have become so concerned about the training of future craftsmen that they have been instrumental in setting up certain standards of training to which the young workers, as well as the employers, must conform. In a great many cases, one of the standards is that the youths shall spend a certain number of hours each week in a class or school for the purpose of learning something of the theoretical side of their trade. Frequently, especially in our larger cities, this theoretical training is provided in the evening school, or in separate classes under the city educational authorities. When this is the case, the department of vocational education is the one most likely to be called upon to provide the instruction. If this instruction is to be adequate, there must be a close coordination between the shop and the school. The coordinator must necessarily obtain much of his information and advice regarding the pupils from the foremen to whom the boys report. If the foremen are in sympathy with the aims and purposes of the school, they will prove to be an invaluable help in making the school function effectively. If they are not, the chances are more than even that the work will be unsuccessful.

Aid in Placement

Another school activity in which the foreman may be helpful is in the placing of the pupils into suitable jobs.

Placement work has come to be recognized in many of our cities as a legitimate function of the school and as a general rule, this work is included in the program of the department for vocational education.

The effectiveness of a placement program depends to a large extent upon the relationship which has been built up between those responsible for the work and those who employ the product of the school. This is particularly true in regard to the foreman, the man to whom the young worker is directly responsible.

The placement officer is likely to have little difficulty in securing the support of the personnel manager, but the foreman, who is usually more conservative in his attitude toward what he considers to be outside interference, is more difficult to reach. When an employee comes to his department through any channel other than the one he sets up, he is frequently indifferent and sometimes frankly antagonistic toward him. Not only so, but he is likely to resent what he chooses to call a waste of time when a representative of the school presents himself in the shop in the interest of the young worker.

Here again, as in the case of the cooperative work, if the foreman is familiar with the aims and purposes of the department of vocational education, he is more likely to accept the individuals recommended by the school placement officer. If the public schools do not offer courses for foremen, this avenue of approach to the interest of the keymen in industry is lost and the placement work is sure to suffer as a result.

Aid in Part-Time Education

Part-time education is still another activity for which the department of vocational education is responsible in many of our cities.

Where this type of work is carried on, difficulty is frequently encountered in securing the cooperation of the employers on account of the fact that the children must be excused from work for four or eight hours a week, according to the community.

Regardless of how willing the employer may be to help the cause of part-time education, the foreman may insist that his organization demands that his workers be on the job every working hour. When the foreman takes this stand on a question that is not vital to the firm, there are few employers who care enough about part-time education to make an issue of it with him.

If part-time education is to be successful, the foreman must be for it. He is not for it on some occasions because he knows little about the school and has little confidence in its ability to do anything for a worker. If he can be induced to attend classes conducted by the same authorities as those who are concerned with the part-time school, he will under proper instruction, develop the feeling that he is learning something about his own job. It is a short step indeed from receiving benefit oneself to believing that others may benefit.

Other illustrations might be added to those given, but perhaps sufficient has been said to emphasize the fact that the foreman is essential to the efficient functioning of the department of vocational education.

Field for State or Federal Action

I have said that there are exceptions to the stand I have taken. I can imagine a situation in which it is almost impossible for a director of vocational education to induce his board to spend money on a program for training foremen. In a case of this kind, it may be desirable to follow the plan used in one city in Michigan. In this case, the University of Michigan started an intensive campaign in order to interest the people of the community in the work. This was carried on, along with similar classes in other communities, for two years. At the end of that period, a meeting was called for the purpose of discussing the continuance of the work. The university took the stand that the problem was a local one, and that they had merely been subsidizing the work in order to give it its original impetus. Owing to the insistence of the employers, the school authorities agreed to hire a man to take up the work where the university left off. This man has been on the job for over three years and he has done an excellent piece of work. As a result of his experience, he has expressed the opinion that his contacts with these foremen have been most helpful in carrying on the program of vocational education. The director of vocational education has expressed himself similarly, and has gone as far as to say that there is no phase of the work in his department that has been more helpful in bringing to its aid the help and guidance which only men of long experience under factory conditions can give. Probably some of the work being done by the federal board is of this missionary type, carried along for a period long enough to demonstrate its value, then left to the local community or industry to continue it.

Another exception might be made in the case of those men who are preparing themselves to become leaders of foremen's conferences. This type of work has a place only in a large community or in a central location which draws upon a large area for its students. This phase of the work can best be carried on by the federal board in regional conferences, or by such agencies as Dunwoody Institute. These agencies can draw upon a large territory and by working together can train all the leaders for whom there is likely to be a demand.

Summary

In conclusion, I should like to summarize by presenting the points I wish to emphasize.

1. Educational leaders are coming to see more and more that the local school must provide for the education of all.

2. This means that the mature person, who has awakened to the value of education will have an opportunity to realize his awakened ambition.

3. City school authorities have been meeting this responsibility by providing education from the kindergarten up to, and including, college work.

4. This work has been offered by means of day courses, part-time courses, evening courses, and correspondence courses.

5. The foreman as a member of the community has a right to demand that his desire for training be met.

6. Therefore, the training of foremen is a direct responsibility of the city school authorities, and as such, should be included as an integral part of the program for vocational education.

7. The success of any plan for apprenticeship training, cooperative training, vocational guidance, or part-time education depends almost entirely upon the willingness of the people with whom the workers come in contact, to cooperate.

8. This is particularly true in regard to the foreman, the man to whom the workers report directly, and upon whose aid and advice the director of vocational education depends.

9. And finally, since the local school authorities are responsible for all educational work in the community; since a full measure of success in any program for vocational education is possible only through the active cooperation of the foreman, and since the foreman needs and desires training, therefore, as a matter of policy, as well as a matter of actual duty, the training of foremen should be made a definite part of any program for vocational education in every city where there are a sufficient number of foremen to make it worth while.

A NEW ILLINOIS SOCIETY TO BE FORMED

On Friday and Saturday, November 26 and 27, following Thanksgiving day, steps will be taken to form a new state society in Illinois to affiliate with the new American Vocational Association.

A committee composed of Charles A. Bennett, Peoria, chairman; J. F. Kolb, state supervisor of industrial education, University of Illinois; A. G. Bauersfeld, Chicago Public Schools, and A. B. McCall, high school, Springfield, have been at work on the details since last February. Assisting this general convention committee there are ten special committees which are arranging the details of the program. The chairman of these special committees are as follows: Agriculture, A. W. Nolan, University of Illinois; Art Education, Harriett M. Cantrall, supervisor of art, Springfield; Commercial Education, Marguerite Higgins, Joliet; Home Economics, Adah H. Hess, state supervisor, Springfield; Industrial Education, Leroy P. Elliott, supervisor industrial education, Peoria; Industrial Rehabilitation, R. R. Clarke, state supervisor, Springfield; Part Time Education, N. F. Fultz, Cicero; Industrial Relations, E. E. Sheldon, R. R. Donnelly & Co., Chicago; Personnel and Guidance, Joseph V. Hanna, Township High School, Joliet; Printing, Fred J. Hartman, Educational Director, United Typothetae, Chicago. With this committee in charge, a splendid program is assured. The sectional meetings will be real round tables and may be expected to discuss the every day problems of the teachers.

There will be a general session on Friday afternoon dealing particularly with high school problems and on Saturday morning prominent national leaders in vocational education, both from the schools and the industries, will be on the program.

The adoption of a constitution will be one of the important matters to come up before the business meeting.

Mr. Bennett, chairman of the convention committee, reports that the response has been most hearty from every section of the state and a strong society is already assured.

The local committee headed by W. J. Bogan, assistant superintendent of schools, has secured the Auditorium Hotel as headquarters. This will insure ample room for general sessions, round tables and exhibits. A dinner will be held on Friday evening to celebrate the founding of the new society and it is expected that the list of charter members will take in practically every one of prominence in vocational education throughout the state.

A commercial exhibit will be one of the features of the meeting. Coming one week before the American Vocational Association meeting at Louisville many exhibitors are planning to exhibit at Chicago and then move their exhibits direct to Louisville. Urban G. Willis, superintendent of the Pullman Free School of Manual Training, and Leonard W. Wahlstrom, of the Francis W. Parker school, Chicago, are in charge of the exhibits.—L. W. Wahlstrom.

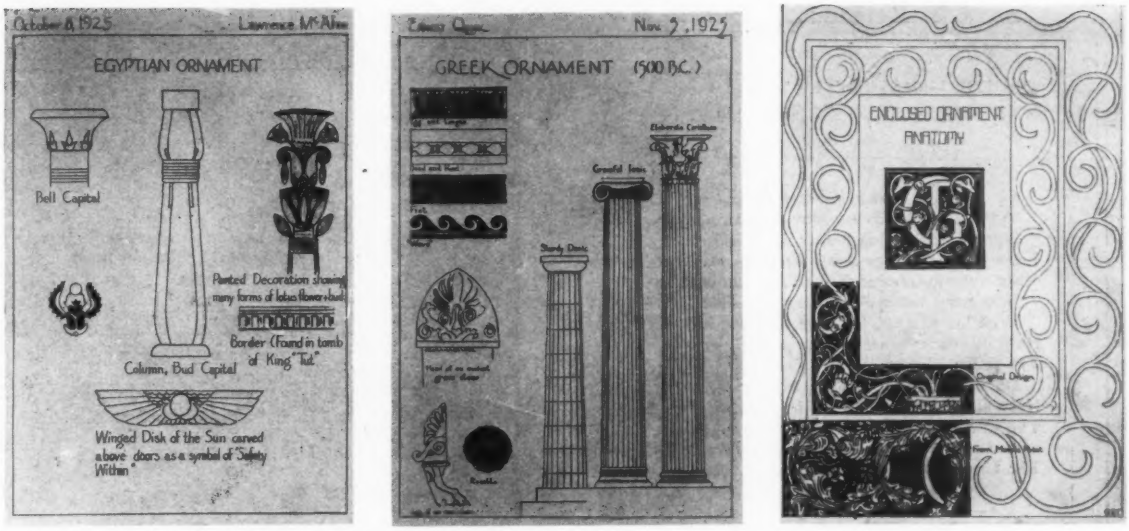

EGYPTIAN ORNAMENT
Bell Capital
Painted Decoration showing many forms of lotus flower-bud
Border (Found in tomb of King Tut)
Column, Bud Capital
Winged Disk of the Sun carved above doors as a symbol of "Safety Within"
GREEK ORNAMENT (500 B.C.)
ENCLOSED ORNAMENT
ANATOMY

FIGURE 1. TYPICAL STUDY PLATES OF HISTORIC ORNAMENT PREPARED BY THE AUTHOR'S STUDENTS. At the left is a plate devoted to Egyptian ornament; in the middle is a plate of typical Greek architectural detail; and at the right is a study of enclosed ornament based on a Morris book. The originals are in color.

Vocational Printing and Historical Ornaments

Dorothy Allen, Indianapolis, Ind.

Vocational printing among shop courses in vocational education can perhaps most easily meet the demands of the "fundamentalist" group of public school educators, so closely is it linked with purely creative and cultural subjects. The accompanying plates show problems worked out in classes in vocational printing design in the Indianapolis Technical High School, which undertook the study of type ornaments.

Today's typographers, largely inspired by the freshly woven fabric of Bruce Rogers' typography, are making their pages truly creative by new combinations of type ornaments. Though much of the type ornament is from historic sources, even the historic ornaments in typography have been infused with the breath of life in modern printing.

To develop an easy familiarity with their materials, the class delved down into the bony structure of ornaments on the market and made some attempt at designs

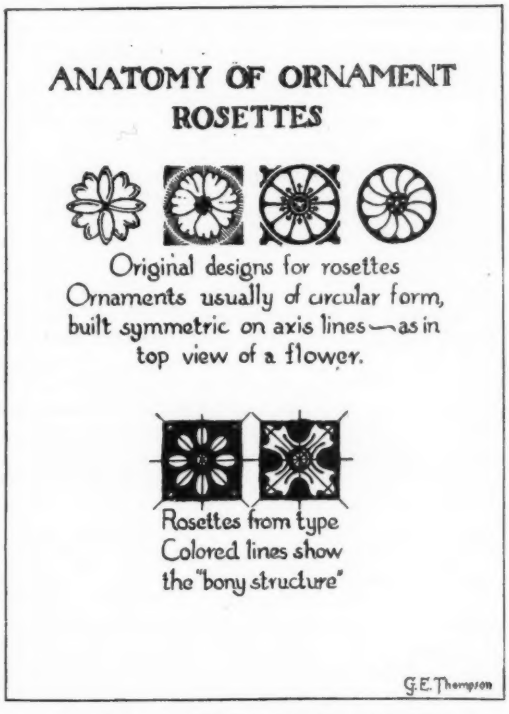

ANATOMY OF ORNAMENT
ROSETTES
Original designs for rosettes
Ornaments usually of circular form, built symmetric on axis lines—as in top view of a flower.
Rosettes from type
Colored lines show the "bony structure"
G.E. Thompson

FIGURE 2. A TYPICAL PLATE ANALYZING ORNAMENT ROSETTES.

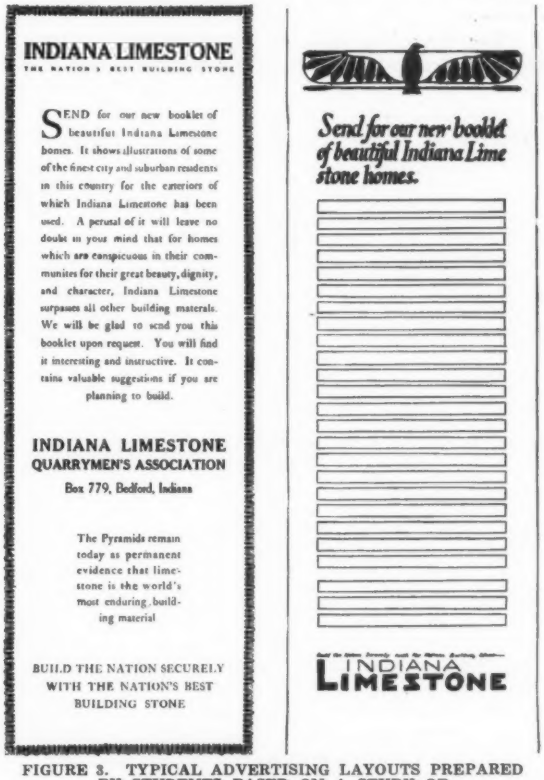
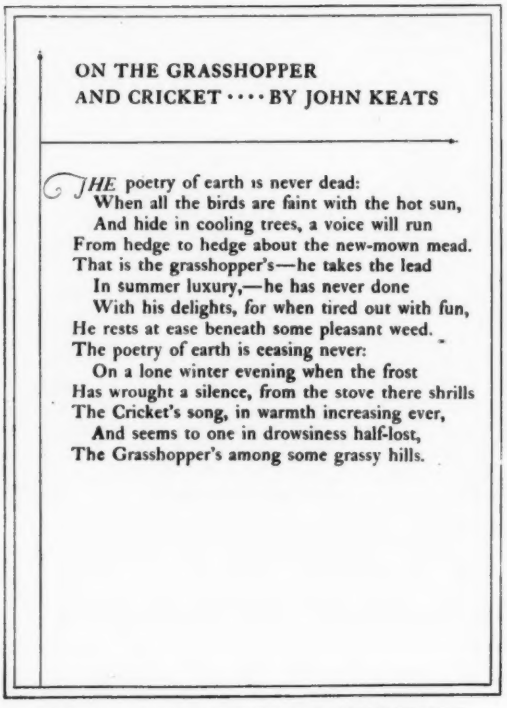

INDIANA LIMESTONE
THE NATION'S BEST BUILDING STONE
SEND for our new booklet of beautiful Indiana Limestone homes. It shows illustrations of some of the finest city and suburban residents in this country for the exteriors of which Indiana Limestone has been used. A perusal of it will leave no doubt in your mind that for homes which are conspicuous in their communities for their great beauty, dignity, and character, Indiana Limestone surpasses all other building materials. We will be glad to send you this booklet upon request. You will find it interesting and instructive. It contains valuable suggestions if you are planning to build.
INDIANA LIMESTONE
QUARRYMEN'S ASSOCIATION
Box 779, Bedford, Indiana
The Pyramids remain today as permanent evidence that limestone is the world's most enduring building material
BUILD THE NATION SECURELY WITH THE NATION'S BEST BUILDING STONE
Send for our new booklet of beautiful Indiana Lime stone homes.
INDIANA
LIMESTONE

FIGURE 3. TYPICAL ADVERTISING LAYOUTS PREPARED BY STUDENTS BASED ON A STUDY OF HISTORIC ORNAMENT.



ON THE GRASSHOPPER
AND CRICKET ···· BY JOHN KEATS

THE poetry of earth is never dead:
When all the birds are faint with the hot sun,
And hide in cooling trees, a voice will run
From hedge to hedge about the new-mown mead.
That is the grasshopper's—he takes the lead
In summer luxury,—he has never done
With his delights, for when tired out with fun,
He rests at ease beneath some pleasant weed.
The poetry of earth is ceasing never:
On a lone winter evening when the frost
Has wrought a silence, from the stove there shrills
The Cricket's song, in warmth increasing ever,
And seems to one in drowsiness half-lost,
The Grasshopper's among some grassy hills.

FIGURE 4. A PAGE SET UP FOR ORNAMENTING.

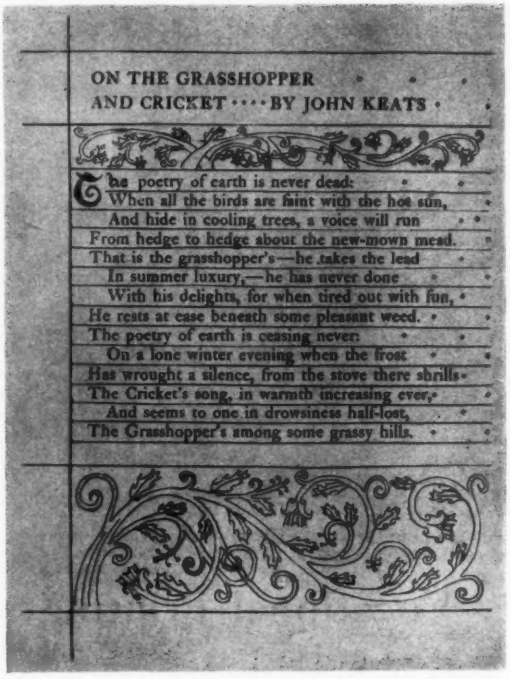


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FIGURE 5. A STUDY OF AN ORNAMENTED PAGE. The type is set in black and the rules and the ornament are freehand in red.

of their own. In their printers' English class, under Miss Schellschmidt, the class studied and wrote themes on historic ornament, the best of which they printed in the shop under the direction of Mr. Auble. Space was left in these little booklets for tracings of significant forms of historic ornament.

The reward of this space work comes in the consciousness of competence in the handling of type ornaments. Problems in which the students made their experiments in this handling ranged through cover designs, layouts for title pages, letter heads, cards, and advertisements. Ornament cases have proverbially been a Pandora's box of trouble to the uninstructed. Many printers on principle keep the ornament cases locked from the apprentice, who therefore never properly learns to use them. The shop is too busy a place ordinarily to allow the apprentice to lavish time on a study necessitating so much research. The vocational school furnishes the laboratory of research and experiment in which the acolytes in the craft may make their demands on the departments of history, English, mathematics, and art.

Spacing

John F. Locke, Department of Vocational Education, Cincinnati, Ohio

Uniformity in spacing is of the highest value in good printing. In fact, no book or job can be considered artistic, or even passable from a typographic standpoint, if the spacing is not as uniform as it is possible to make it throughout the production.

The student must be taught to keep in mind that every line he spaces has a direct and important bearing upon every other line that goes to make a completed page. The matter of spacing influences the final appearance of a completed job.

Every line requires different spacing. As a consequence, the compositor must use judgment. The idea of a correctly spaced line is to have the space appear equal between the words of a given line when in print.

By uniform spacing we do not mean the same amount of spacing between every word in the line. I have seen boys put the same amount of space between every word, and on looking at their proof, wonder why it was that there appeared more white space between some words than others. They were positive that they had put the same amount of space between each word. And they had. That was the reason it appeared the way it did. So, by uniform spacing, we do not mean that the spacing is uniform but rather that it appears uniform. There is a very fine distinction there.

For example, if a line contains words either beginning or ending in straight, tall letters like I, l, t, j, T, L, and A, there will appear to be less space between them than there is between sloping letters like w, y, x, and v, or between rounded letters like o, p, d, g, q, and b. The same holds true after certain of the marks of punctuation. To offset this difference, instead of always using the same amount of space in each case it is necessary to put more space between the high and straight letters than between the curved and sloping ones.

Quads and spaces are bodies of type, of the same size as the type with which they are used, but are less than type high so that wherever they are placed a white space appears in the print. They are of various thicknesses. Therefore, it is easy to understand that these are used to place between words, to separate them, one from another.

The unit of spacing material is the "em quad." Every piece of spacing metal whose face is square, is an "em quad." Therefore, the em quad is the square of the

Lines Showing Different Spacing	Kind of Spaces	Fraction of Em	Common Denominator
Iseeapieceoften-pointtypeonthefloor.	Solid	.....	....
Iseeapieceoften-pointtypeonthefloor.	Hair spaces	.....	....
I see a piece of ten-point type on the floor.	Five-em	1/5	12/60
I see a piece of ten-point type on the floor.	Four-em	1/4	15/60
I see a piece of ten-point type on the floor.	Three-em	1/3	20/60
I see a piece of ten-point type on the floor.	Two 5-em	1/5 + 1/5 = 2/5	24/60
I see a piece of ten-point type on the floor.	Four-em and five-em	1/4 + 1/5 = 9/20	27/60
I see a piece of ten-point type on the floor.	En quad	1/2	30/60
I see a piece of ten-point type on the floor.	Three-em and five-em	1/3 + 1/5 = 8/15	32/60
I see a piece of ten-point type on the floor.	Three-em and four-em	1/3 + 1/4 = 7/12	35/60
I see a piece of ten-point type on the floor.	Three 5-em	1/5 + 1/5 + 1/5 = 3/5	36/60
I see a piece of ten-point type on the floor.	Four-em and two 5-em	1/4 + 1/5 + 1/5 = 13/20	39/60
I see a piece of ten-point type on the floor.	Two 3-em	1/3 + 1/3 = 2/3	40/60
I see a piece of ten-point type on the floor.	Five-em and en quad	1/5 + 1/2 = 7/10	42/60
I see a piece of ten-point type on the floor.	Three-em and two 5-em	1/3 + 1/5 + 1/5 = 11/15	44/60
I see a piece of ten-point type on the floor.	Four-em and en quad	1/4 + 1/2 = 3/4	45/60
I see a piece of ten-point type on the floor.	Three-em, 4-em and 5-em	1/3 + 1/4 + 1/5 = 47/60	47/60
I see a piece of ten-point type on the floor.	Four 5-em	1/5 + 1/5 + 1/5 + 1/5 = 4/5	48/60
I see a piece of ten-point type on the floor.	Three-em and en quad	1/3 + 1/2 = 5/6	50/60
I see a piece of ten-point type on the floor.	Four-em and three 5-em	1/4 + 1/5 + 1/5 + 1/5 = 17/20	51/60
I see a piece of ten-point type on the floor.	Five-em and two 3-em	1/5 + 1/3 + 1/3 = 13/15	52/60
I see a piece of ten-point type on the floor.	En quad and two 5-em	1/2 + 1/5 + 1/5 = 9/10	54/60
I see a piece of ten-point type on the floor.	Four-em and two 3-em	1/4 + 1/3 + 1/3 = 11/12	55/60
I see a piece of ten-point type on the floor.	Three-em and three 5-em	1/3 + 1/5 + 1/5 + 1/5 = 14/15	56/60
I see a piece of ten-point type on the floor.	Five-em, 4-em and en quad	1/5 + 1/4 + 1/2 = 19/20	57/60
I see a piece of ten-point type on the floor.	Three-em, 4-em and 2 5-em	1/3 + 1/4 + 1/5 + 1/5 = 59/60	59/60
I see a piece of ten-point type on the floor.	Em quad	.....	60/60

type body. An 8-point em quad is always 8 points square, while a 12-point quad is 12 points square.

The standard for sizes of quads and spaces in each size of type is the em quad of that size of type. An em quad is known by many other terms: *em, mutton,* or simply *quad.* Quads are of different sizes and each one of different size is known by the number of ems its face is wide. In other words, there are multiples of the em quad—two and three-em quads in every size of type.

By the aid of common fractions, the apprentice will be able to figure for himself the ratio that the spaces bear to one another; using 60 as a common denominator, the exact width of all the spaces and combinations of them, can easily be determined.

Good composition requires that a three-em space be placed between words in a line. Then if it is necessary to justify the line by re-spacing it, replace the three-em spaces with wider ones. Ordinarily, if the line is not full, we take out the three-em spaces and substitute en spaces (nut quads), if the line is still short, take out the en spaces and put in two three-em spaces. However, it is easy to understand from Unit 127 that finer spacing than this can be done. The changing of all spaces between words in a line according to this chart, is not practiced on all work as too much time would be consumed.

Fine spacing of this character is easily accomplished on the typesetting machines but in hand composition any looseness or tightness in a line caused by the changing from three-em to nut spacing, or from nut spacing to two three-em spacing is usually taken care of by changing only enough after punctuation marks, or between tall, straight letters or rounded letters (as mentioned before) to make the line exactly tight.

The space used in ordinary composition is the three-em space, placing them after each word. When the end of the line is reached and there is not room for another whole word, it is necessary to either divide the word or to space out the line. Either procedure will necessitate a changing of the spacing of the entire line. Most lines require a changing of spaces, and this part of spacing is called justification.

When the line has been set and glanced over for corrections, and they have been made, the next step is to space the line so that it will fill the measure. Uniform spacing is an essential to satisfactory work. Each line must be spaced to the same measure, otherwise it will be impossible to lock up the job tightly upon completion. If one line is spaced more tightly than the next, the stick will not only spring, thus changing the measure, but when the job is locked up some of the shorter lines are liable to drop out of the form.

Space the line so it will not drop if lifted slightly in the stick. If the last space has been forced down, the line is too tight; should the line drop when lifted, it is too loose.

The correct spacing of lines is undoubtedly the hardest task that the apprentice has to accomplish. However, perfection and skill in this can only be acquired by many hours of practice.

The time spent on correction of errors in the line before it is justified is time well spent; it often saves a great deal of time and trouble after the matter has been made up into pages, or placed in the form.

The careless spacing of one line may necessitate the running over of an entire paragraph; this would require more time than would be necessary for correct work at the start.

Avoid both extremes in spacing; neither very thin nor very wide spacing is absolutely necessary when setting type to any ordinary measure, it is either an indication of carelessness or incompetence. Whenever it can be done, avoid the recurrence of the same word either at the beginning or ending of a line; however, do not follow this rule when to do so would necessitate a badly spaced paragraph.

Wider spacing than two three-em spacing, is not allowable usually, except in long lines or double leaded matter. Space out whenever possible, rather than space back (decrease).

When justifying a line, avoid thin spacing, or the use of thin spaces, as far as possible; also, try to avoid too wide spacing, better to go back a line or two and respace to obtain proper spacing.

The leading of the matter must be taken into consideration when spacing; the heavier the leading the wider the space required between words—up to a reasonable limit. In matter to be used solid, an occasional thin-spaced line is permissible; in wide-leaded matter not even passable.

The beginning of a paragraph should be indented; this width of the indention is regulated by the style and

specifications of the job. Whatever the indention, it must be uniform throughout the job.

At the end of the paragraph, however, fill in the remaining space of the line with quads, leaving three-em spaces between the words. Never allow a paragraph to end with less than an em quad.

A short line at the end of a paragraph should be avoided. When a paragraph would end with a word of three or four letters in the last line, a little calculation before reaching this point will enable the student to run over a word or two on the last line in order to avoid the long quad line.

Never use a thin or regular space at the end of a full line or at the end of a quaded-out line; in the latter case the spaces must be placed between the period and the quads.

Where one sentence ends and another begins an em quad is generally used after the period. Although many printers still do this, the modern tendency is toward less space after the period.

Many excellent printers reason thus:

The end of one sentence is marked by a period, and the begining of the next sentence is indicated by a capital letter. Therefore, a wide space is not necessary, and as a matter of fact, it often happens that the use of an em quad in this respect will make the spacing in the line appear very ununiform. The tendency seems to be toward the use of a nut quad in addition to the regular space. This produces spacing that is essentially in proportion.

Effect of Tests and Measurements in Shop Work on Shop Instruction[1]

Herbert A. Toops, Ohio State University

Looking over the field of education generally, we note a great increase in regard for the child, particularly as to what he is when viewed in cross-section; perhaps it would be more correct to say as viewed in quarter-section, for we have viewed him only reasonably adequately in intelligence thus far. We shall soon know well what the child is. We are beginning to take adequate account of what he has done and what he can do.

It is evident to those who have given little thought to the problem that not an intellectual hurdle, but rather a mechanical hurdle, if any, should bar the gate to the trade school. A trade school education should be a practical one; it should be used; it should provide the means for a better livelihood of any boy who takes it, even though he be "not very bookishly inclined." Mechanical performance tests are known to have this advantage, namely, that some boys who do poorly at academic things may make an average or even a very superior score on a mechanical assembly test. The writer bewails both of the attitudes: (a) Completion of elementary school is a necessary requisite to trade school entrance; (b) all highly intelligent boys should be guided into professions or business. For two reasons intelligence tests should not be used as an entrance hurdle to trade schools.

1. The trades have need of practically every degree of intellect.

2. Degree of intelligence is not highly related to trade school success.

A good vocational aptitude test should possess the following characteristics in marked degree:

1. It should predict mechanical capacity well. This means almost certainly that a good mechanical test will be a performance test and not a paper-and-pencil test.

2. It should be highly reliable in the sense that it is long enough and so scaled that a rating of any given amount received by a certain pupil today will be substantially repeated tomorrow on a retest or an alternative form of the test.

3. It should be objectively and easily scored. Human judgment should enter but little into the scoring.

The test which comes nearest to fulfilling these requirements is the Minnesota edition of the Stenquist Assembly Test. This test has 36 disassembled mechanisms which are to be put together, and requires two class periods for its administration. It is therefore long enough to give valid and reliable results.

In the tests it is found that some pupils do very well; these will learn very rapidly in a trade school. Some do very poorly and it is probable that these for the most part will learn very slowly. These slow learners are by no means all bookishly dull pupils; some come from the ranks of those who make A's in their academic subjects. At the University of Minnesota, in their vocational guidance inquiry, they are trying to find out whether, what a boy does and has done throughout his childhood at home alone the mechanical line has anything to do with the question of his present proficiency. They have rating scales so as to be able to say that this boy's home as to the adequacy of its mechanical environment is an A home, or this boy's home is a C home. The institute of research of Teachers' College has for three years followed up the careers of 3,000 boys and girls who were carefully tested on a battery of intelligence, mechanical and clerical tests, to see whether those in school were mechanically minded, really enter mechanical occupations and succeed therein, and whether those not so minded tend to steer clear of such occupations, and whether they succeed when they enter such occupations.

The conclusion is that not all pupils have like past experience when they enter a trade course, not all are of equal capacity; not all will learn at equal rates; and not all will arrive at the same level of proficiency. Our present concern is to see how we may utilize its concepts, and how test methods can assist in giving us a more comprehensive view of industrial education than is given by Selvidge in his book entitled, "How to Teach a Trade." The scheme presents a keen analysis of trade teaching if we grant what is an unwarranted assumption, namely, that pupils never form bad habits, which need to be eradicated, and for which others must be substituted in their place. His four main categories are sufficient to account for what is learned, but do not adequately account for what must be unlearned and relearned.

Any shop teacher can readily construct such a measuring test by gathering up a few odd-shaped blocks about the shop, drawing arrowhead dimension lines of the blocks; labeling each dimension by a letter instead of the numerical value; and then providing the pupil a mimeographed sheet of the letters opposite which he is to write the numerical value of the measurement when made.

Any shop teacher may make up a blue-print reading test by lettering some of the dimensions on a drawing while leaving enough numerical dimensions on the various three views that the pupil can by logical deduction infer the value of the lettered dimensions; as a simple case in point, over-all dimensions are readily found by adding up the sub-lengths for testing the pupil's ability to read the blue print. Such tests may be readily scored by stencil.

[1]Abstract of an address before the Pennsylvania Schoolmen's Week, 1926.

A measuring test, in addition to determining which students are weak in this apparently fundamental prerequisite skill, affords an excellent chance for the instructor to note common deficiencies of the pupils and correct them by calling the attention of the entire class to them. A list of observed deficiencies brought out by the measuring test were presented, and the most frequent ones noted.

The test method has been found to be one of the best methods for presentation of problem situations in the actual learning itself. Mr. C. M. Ward constructed five alternate forms or sets of a similar performance test, the the blocks in the sets being identical in shape. One hour's practice on this test will result in marked improvement in the ability to measure, provided the teacher endeavors to determine the source of past errors and corrects them.

The test method is also a useful pedagogical method of giving instruction in related textbook work. Here, the self-checking feature is readily applied by means of study questions with answers mimeographed on the back of the sheet. The aim is not to see who gets most questions right, but what questions are not clear to the class, and why.

For the development of workmanship character, nothing is so important, from present expectations, as having the pupil rate his own work against an objective performance rating scale of merit; and also rate the work of the classmates. The rating scale insures that the pupil judge each part of his product, and not merely superficial or general aspects of it.

Bad judgment, it is noted, is not always associated with bad work. In an attempt to assist in analyzing bad judgment into its factors, a machine for accurately measuring accessible lengths, widths, thicknesses and diameters, and indicating the amount of errors which the student has in his finished product, has been constructed. The machine shows the actual length of a block, or its actual diameter. By setting it for the measurement indicated on the blue-print, the size and direction of errors will also be shown on a second or error scale, whether oversize or undersize, and just how much.

Self-judgment of work has proven quite worthy of future trial in experimental work done at the Ohio State University. As a basic part of the above experiment, a second group, or control group, did not score its own products, although the students' products were scored by the instructors as in the case of the self-scoring group. The self-scoring group gained more rapidly than the control, or non-scoring group; so that, although the self-scoring group was slightly inferior at the beginning of the experiment, it was decidedly superior on the final examination at the end of the course.

Further studies need to be made in determining the best methods of teaching measuring and blue-print reading and for determining what are the best measuring tools for classroom instruction. The principle that should actuate us is to question whether, just because certain inefficient tools are now conventionally used in the trades, we should assume no progress to be made in the trade and teach the pupils what the tradesmen of 1926 need to know, or whether we should teach, instead, what the best tradesmen of 1936 will probably be using. This is a task for performance proficiency tests used in a research manner to determine the best pedagogical methods.

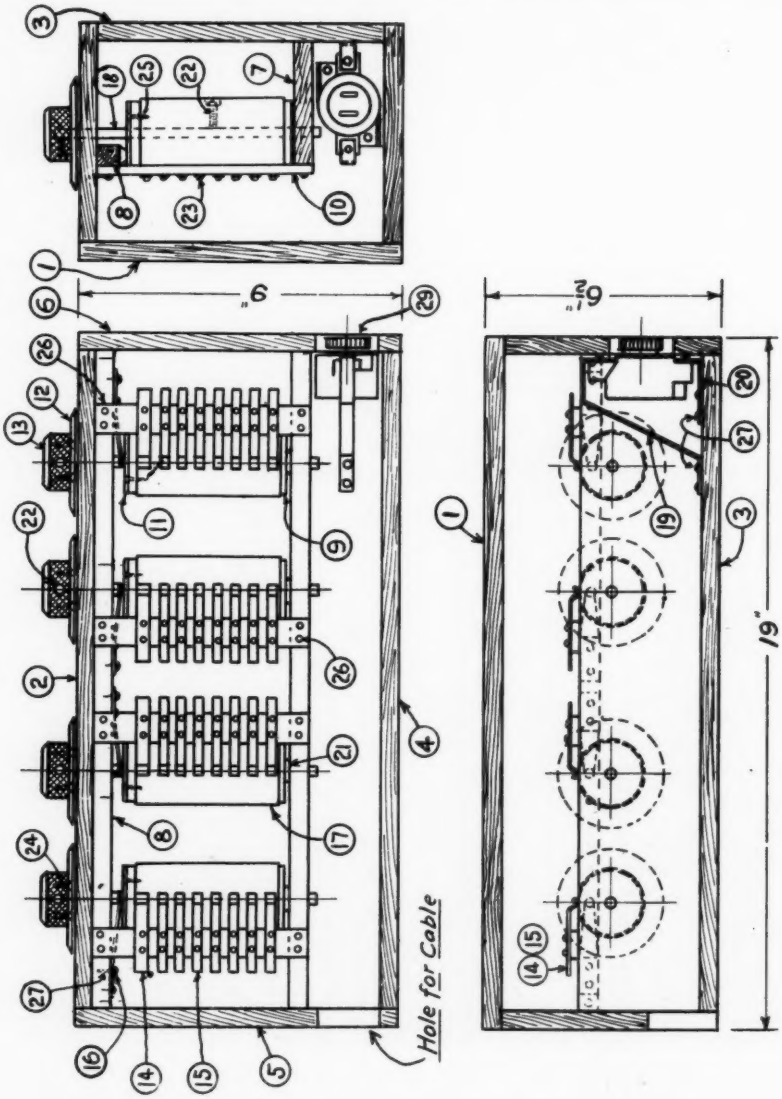
You can't accomplish what you can't imagine. The minute you say to yourself, "Oh, that isn't possible," it isn't possible—for you. But some other fellow who, with his mind's eye, sees the thing finished, will come along and do it. Creative thought is the greatest power in the world.—Jerome P. Fleishman.

DIORAMIC EXHIBIT OF THE LOS ANGELES SCHOOLS AT BERKELEY, CALIF.

During the Summer School session of the University of California, the Los Angeles City Schools held a Dioramic Exhibit of the work carried on in the vocational departments. The vocational education department and the manual arts department showed typical products of the various shops and displayed copies of the courses studied, etc. The material was gathered by Mr. C. A. Kunou, supervisor of manual education.

CONTROLLER FOR ELECTRIC SCORE BOARD

No.	PART	MAT.	REF.
1	Top ¾"x 9"x 19"	H.Pine	1
1	Front Panel ¾"x 6"x 18"	" "	2
1	Base ½"x 8"x 18"	" "	3
1	Back ¾"x 6"x 18"	" "	4
1	Right End ¾"x 6"x 9"	" "	5
1	Left " " "	" "	6
1	Sub Panel ¾"x 3½"x 18"	Pine	7
1	Cleat ¾"x 1"x 18"	"	8
4	Drums 1¾" dia x 4½" long	Maple	9
4	Clip Plates ¼"x ¾"x 6"	Fibre	10
4	Drum Ends 1¾" dia. ⅛" thick	"	11
4	Dials 3" dia. ⅛" thick	"	12
4	" Knobs 1" dia. ¾" long	"	13
4	Contact Clips .05"x ⅜"x 2¾"	Sp.Bz.	14
28	" " .05"x ¼"x 2⅛"	" "	15
4	Stop Springs .05"x ½"x 2⅛"	Sh.Brs.	16
4	Drum Plates .03"x 4"x 5"	" "	17
4	" Shafts ¼" dia. 7½" long	C.R.St.	18
1	Rec. Bracket .06"x ⅜"x 6⅛"	Sh.St.	19
1	" " .06"x ⅜"x 2⅝"	" "	20
4	Cut Washers .06"x ⅜" dia. ¼" hole	St.	21
8	#10-24 x ½" R.H. Mach. Scr.	"	22
64	#6-32 x ⅜" " " "	"	23
8	#10-24 x ½" Flat hd. Mach Scr	"	24
12	½" #5 Flat hd Br. Wood Scr	"	25
16	¾" #6 Rd hd Br. Wood Scr.	"	26
12	½" #5 " " " "	"	27
X	Screws for Assembling Cabinet	Stock	28
1	Plug Receptacle	"	29
X	#14 Rub. Covered Wire for Cable	"	30



Cabinet to be oiled with hot linseed oil and painted dull black enamel.

FIGURE I.

TRACING SUPPLEMENT No. 35,
THE INDUSTRIAL-ARTS MAGAZINE,
NOVEMBER, 1926.

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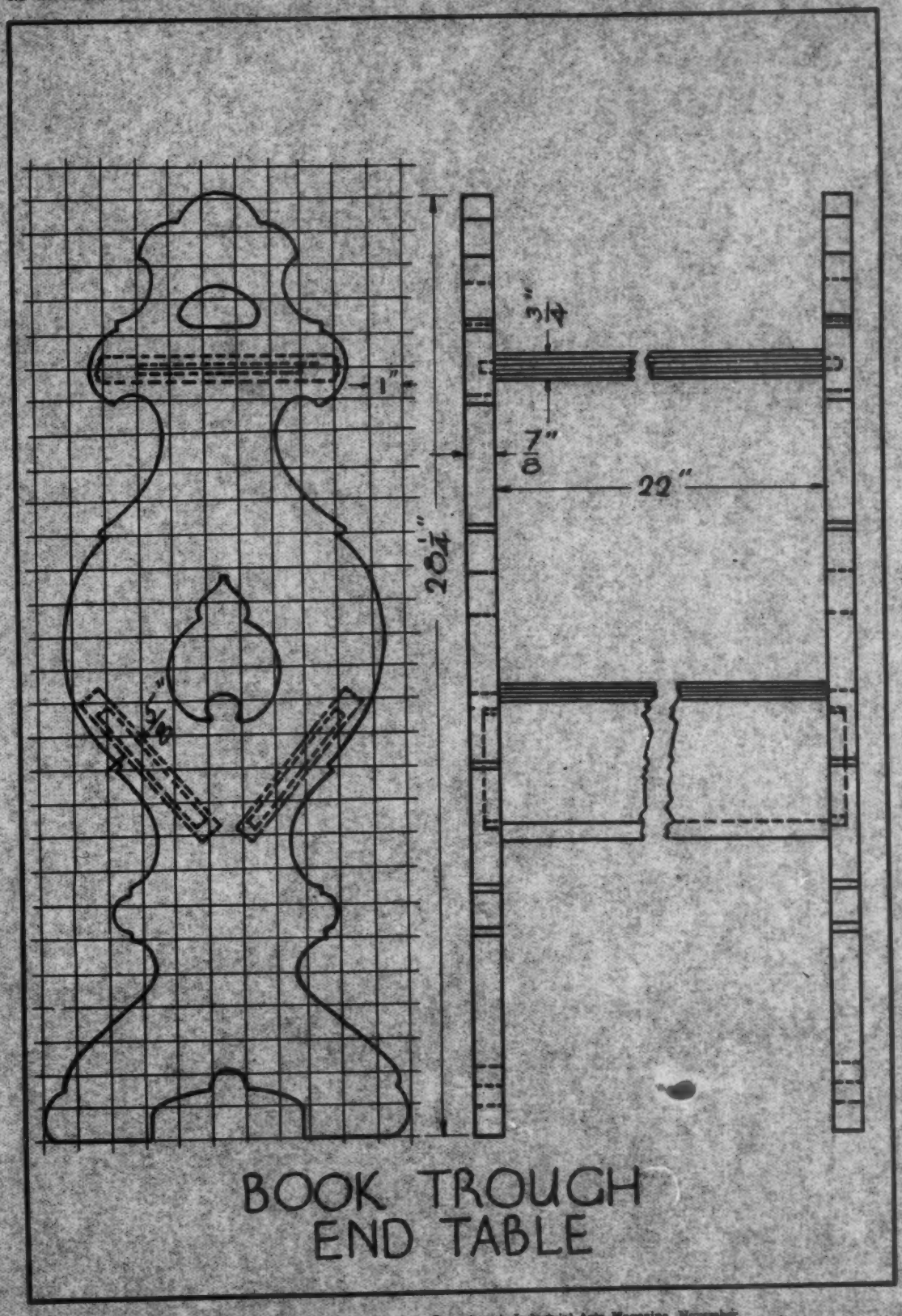

BOOK TROUGH END TABLE

For Details See Problems and Projects Department, Industrial-Arts Magazine, November,
Designed by A. E. Bishey, Shorewood High School, Milwaukee, Wis.

TRACING SUPPLEMENT No. 86,
THE INDUSTRIAL-ARTS MAGAZINE,
NOVEMBER, 1926.

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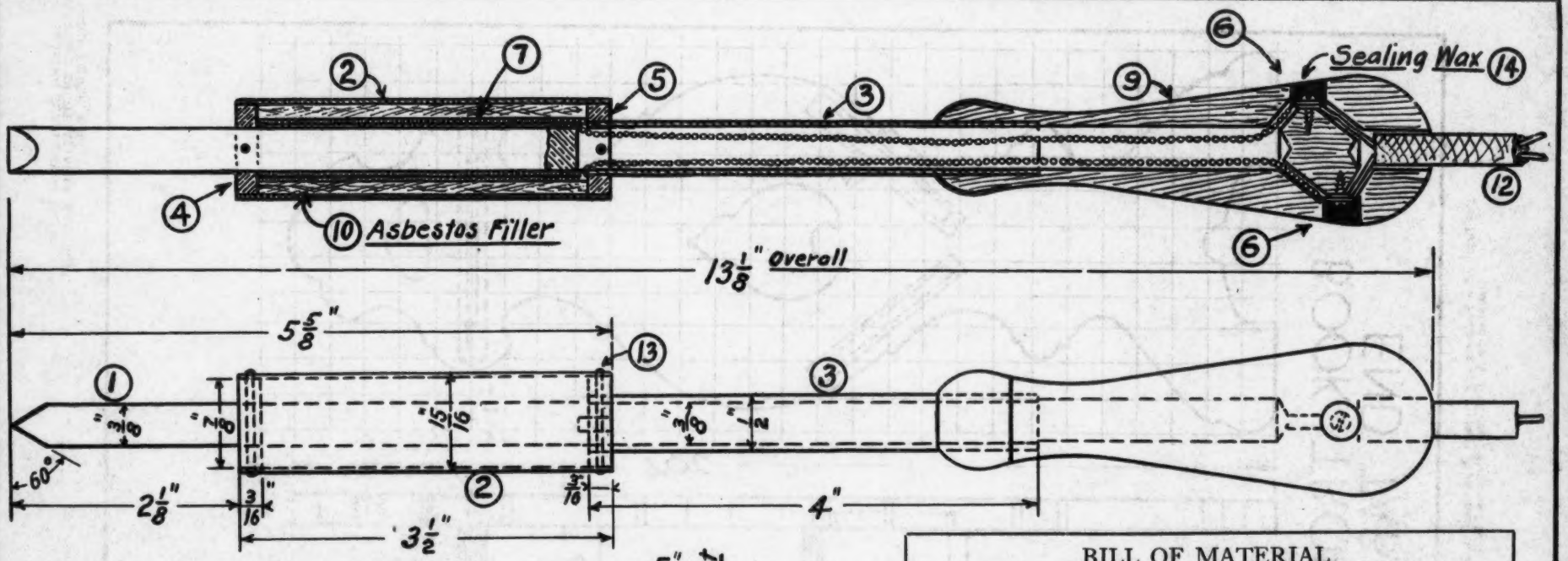

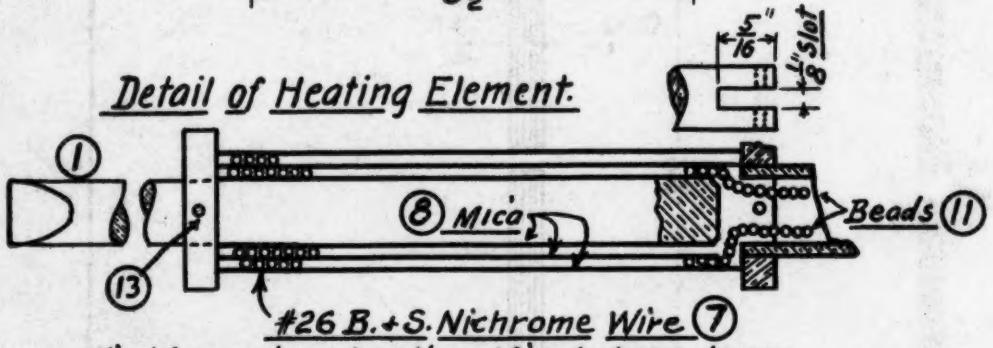

ELECTRIC SOLDERING IRON

BILL OF MATERIAL

No. Wanted	Part	Mat.	Ref.
1	Tip, 3/8" dia. x 5 5/8" long	Copper	1
1	Tubing, 15/16" dia. x 3 1/2" long, 1/32" thick	Brass	2
1	Tubing, 1/2" dia. x 4" long, 1/16" thick	"	3
1	Bushing, 7/8" dia., 3/16" thick, 3/8" hole	"	4
1	Bushing, 7/8" dia., 3/16" thick, 1/2" hole	"	5
2	1/4" No. 4 R. H. Wood Screws	"	6
1	No. 26 Nichrome Wire, 38 ft. long	Nichr.	7
3	Insulation, 2 1/4" x 3 1/8" x .003 thick	Mica	8
1	No. 1 Nicholson File Handle with Ferrule		9
1	Asbestos for Filler		10
x	Beads as required	Glass	11
1	Cord and Plug to suit		12
2	Pins, 1/16" x 1"	Brass	13
x	Sealing Wax as required		14

Drawing by C. A. MacMiller, North Hibbing, Minn.

For Details See Problems and Projects Department, Industrial-Arts Magazine, November, 1926.

TRACING SUPPLEMENT No. 86,
THE INDUSTRIAL-ARTS MAGAZINE,
NOVEMBER, 1934

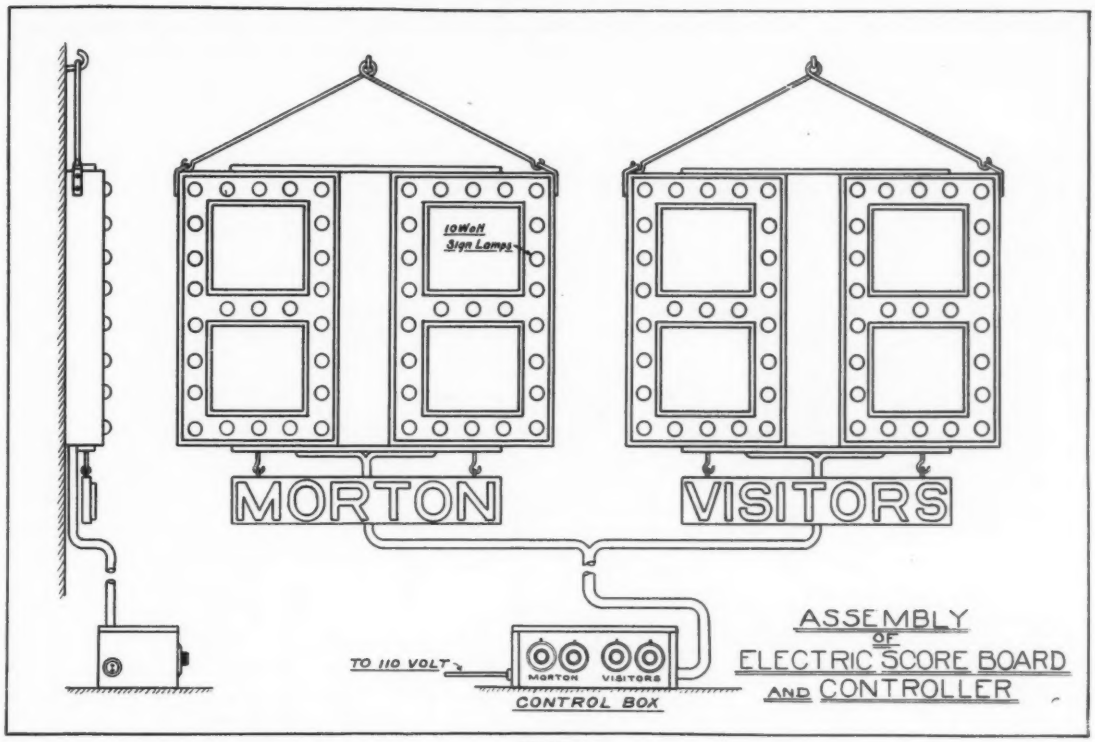

FIGURE 2.

ELECTRIC SCORE-BOARD

G. K. Pierce, H. T. Thomsen, H. D. Campbell

The need for an efficient scoring device for the gymnasium of the J. Sterling Morton High School resulted in the score-board illustrated in the accompanying drawings. Mr. N. F. Fultz, vocational director, suggested that the electric shop design one on which the scores could be flashed by remote control.

Accordingly, Messrs. Pierce and Thomsen sketched tentative plans which were drawn up in Mr. Campbell's drafting room, and from which the board was made. During the drafting process, many changes and improvements

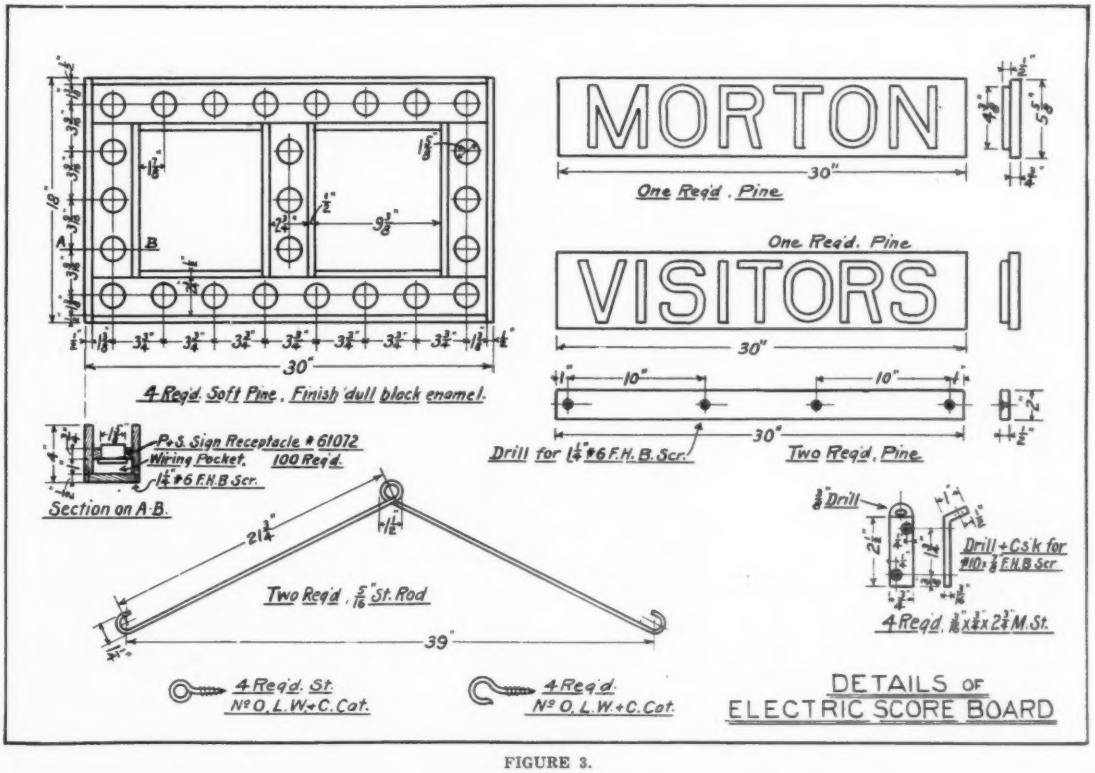

FIGURE 3.

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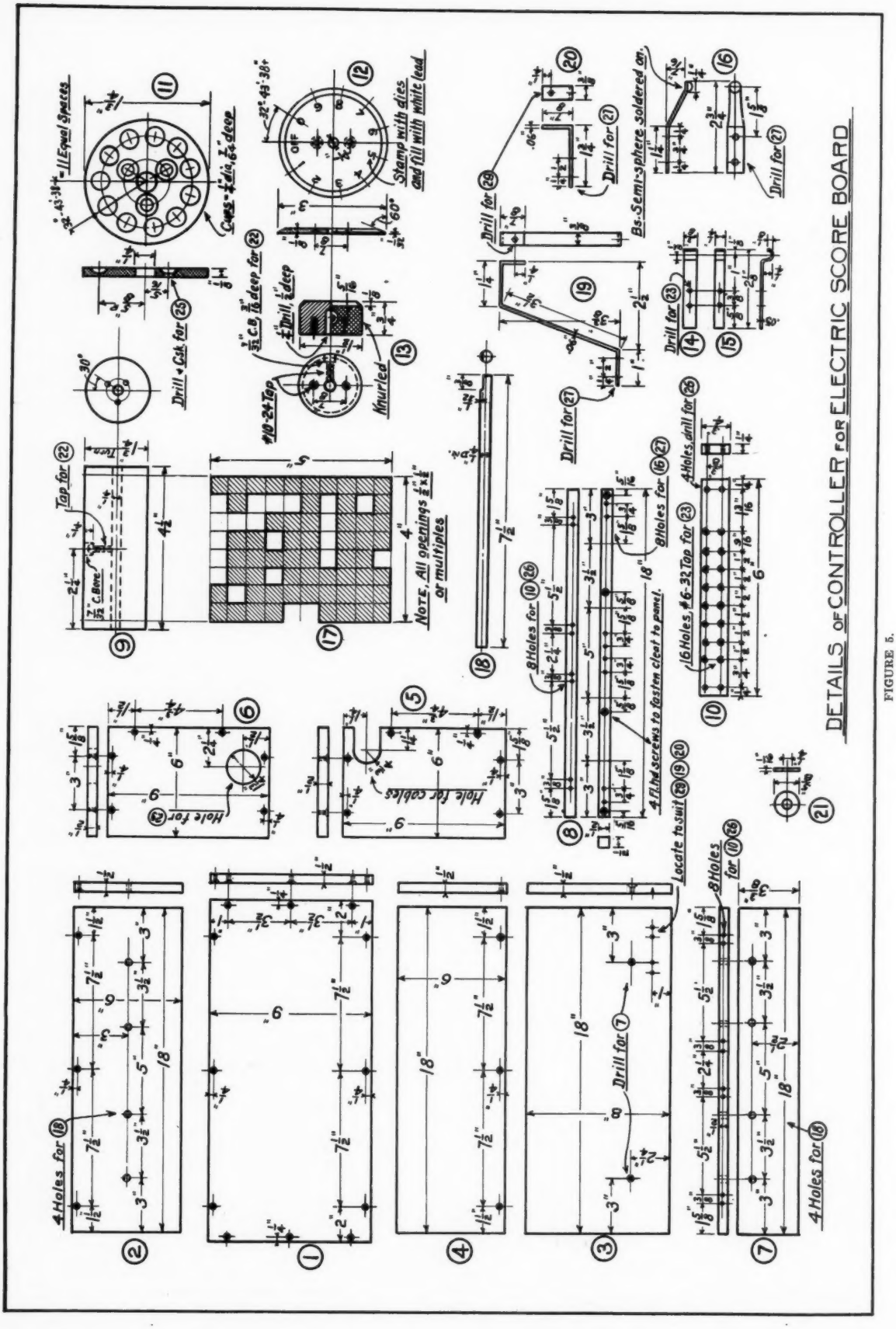

DETAILS OF CONTROLLER FOR ELECTRIC SCORE BOARD
11 Equal Spaces
Drill for
Stamp with dies and fill with white lead
Knurled
Hole for cables
Locate to suit
Drill for
Holes for
Holes, drill for
Top for
Note, All openings
or multiples
Semi-sphere soldered on
Holes
Holes for

FIGURE 5.

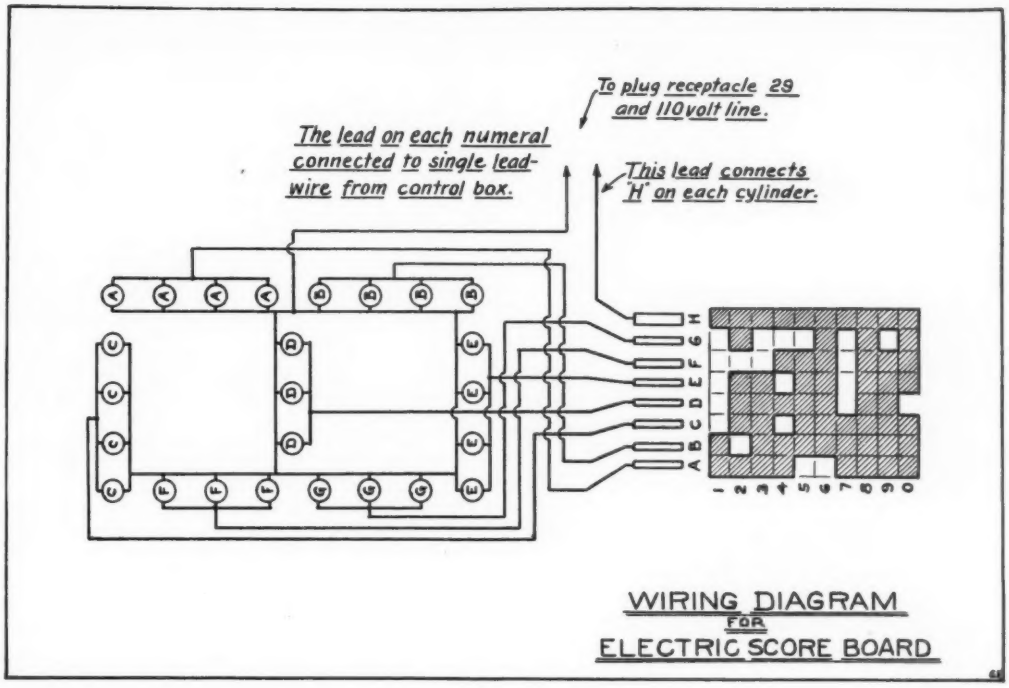

To plug receptacle 29 and 110 volt line.
The lead on each numeral connected to single lead-wire from control box.
This lead connects "H" on each cylinder.
WIRING DIAGRAM
FOR
ELECTRIC SCORE BOARD

FIGURE 4.

were introduced. The drawings represent the finished product.

The design may be recommended as absolutely satisfactory, as the score-board has been in use for over a year. When first used last fall, after being idle during the vacation, it worked perfectly with no repairs or readjustments.

An advantage of this score-board is that, in causing the bulbs to project past the faces of the letters, the score may be read through an angle of only a little less than 180°. When placed high up in a corner, the audience can read the score at a glance.

The board is so designed that it can be made in any school electric shop which has access to a drill press, a lathe, the common hand tools, and which enjoys the co-operation of the wood shop.

The control box is connected to the score-board by a long cable. At Morton the control box has a rope attached to a ring (not shown on the drawings) by which it, with the cable, is hoisted up to the ceiling when not in use. There it is safe from basketballs during routine gymnasium exercise and practice, and out of the way of the curious.

In other places the control box can be protected as circumstances require.

During a game it is lowered to the side lines, the 110-volt lighting current is plugged in, and it is tended by a scorer who sets the dials as needed.

At Morton the gymnasium ceiling is so high that the lamps are not in danger. Where this is not the case, the board may be placed behind the netting.

An improvement of the present design would be to paint the background black on frosted glass, allowing the name of the school and "visitors" to show through when this part of the board is illuminated by separate lamps.

The cost of the board complete, with cable and control box but not including the lamps, is about $35. The lamps cost about $25 more. As used at Morton, the total cost including board, cable, control-box, lamps, rope, pulley, extension cord, and plugs, was about $70.

WOOD CARVING IN JUNIOR HIGH SCHOOL CABINET MAKING

M. A. Mosher, Davenport, Iowa

Several years ago the writer was confronted with the necessity of furnishing a new type of decoration to conform to the newer types of furniture. As the only machinery equipment on hand was a band saw, it was decided to try a little wood carving. The writer's own experience was limited and the first work done was simple chip carving with a few chisels which had been made and tempered in the sheet metal shop.

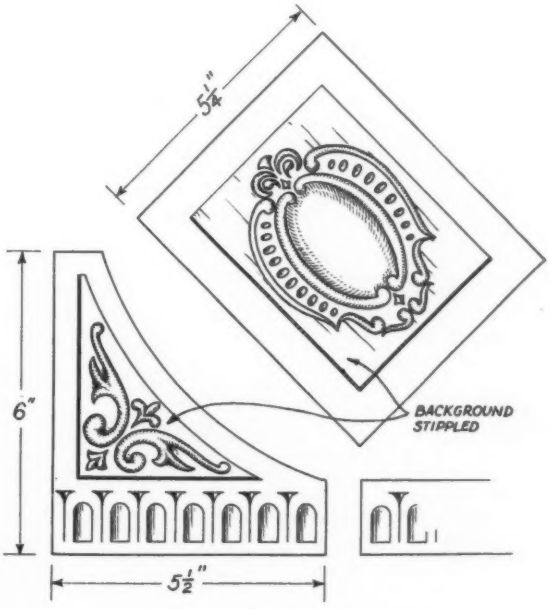


FIGURE 1. DESIGN FOR BOOK ENDS.

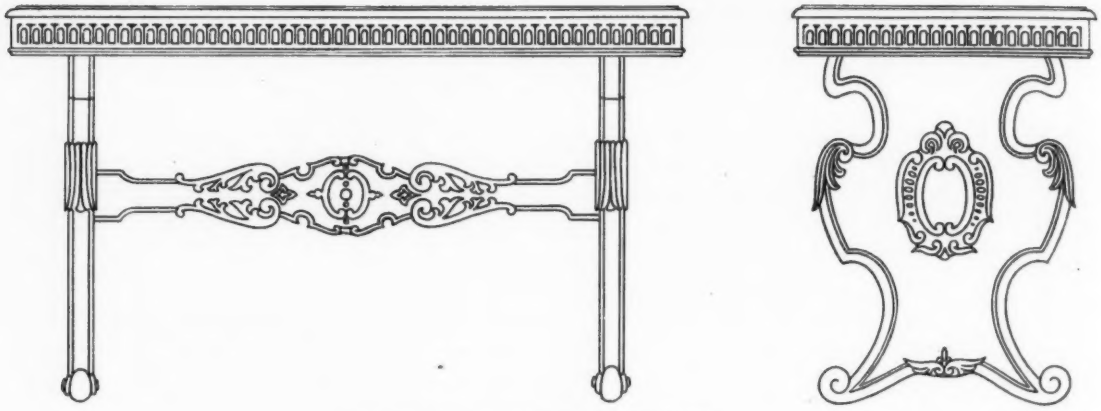


FIGURE 2. DESIGN FOR AN END TABLE.

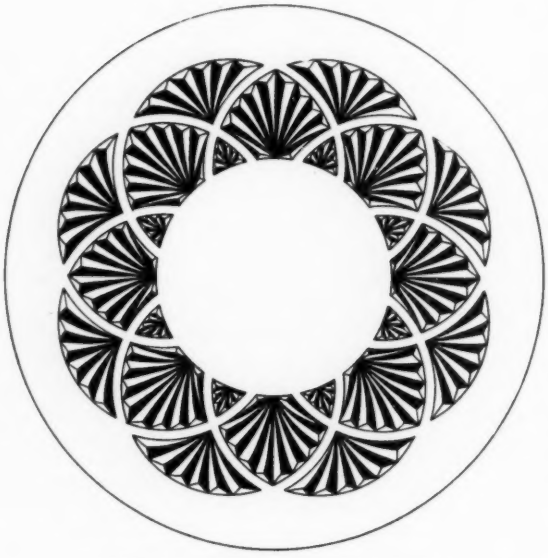


FIGURE 3. DESIGN IN CHIP CARVING.

At first, the boys were rather reluctant to try it as it looked much more difficult to them than it really was. However, after the first few attempts, they became interested and from then on advancement became rapid.

We first bought a small set of six carving tools and the next year we bought a larger assortment of about a dozen tools which are in use at present. As the work is always beginner's work, a large assortment is not necessary. Perhaps half a dozen gouges of assorted sizes and shapes, two V or parting tools, a ½" skew chisel and a ¾" flat chisel, all straight or nearly so, are all that will be necessary in most cases.

I shall not attempt to tell how to do wood carving as that can be found in any book on the subject. But I would like to give some idea of the help and pleasure I have gotten from it in my own classwork.

No other one thing has added half as much interest in the cabinet work. It takes advantage of the boy's natural love for whittling and allows him to exercise his ideas of beauty in a concrete form. The boys will spend every spare moment they can get, sometimes working until late in the afternoon, to carve some design on a piece of furniture that would otherwise have little interest for them. They will borrow the tools at night and carve when nothing could induce them to stay home and study.

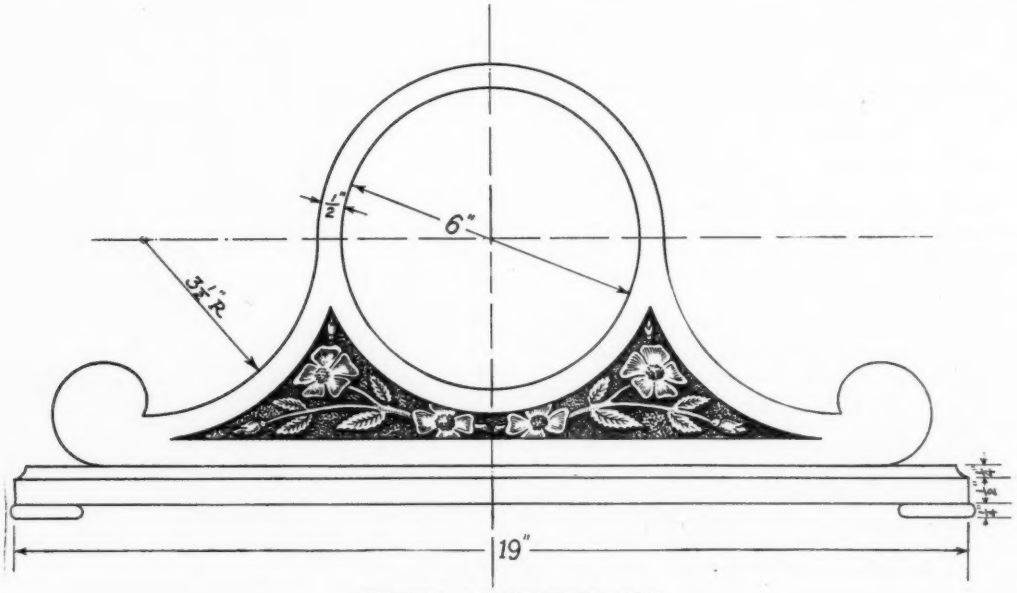


FIGURE 4. CARVED CLOCK CASE.

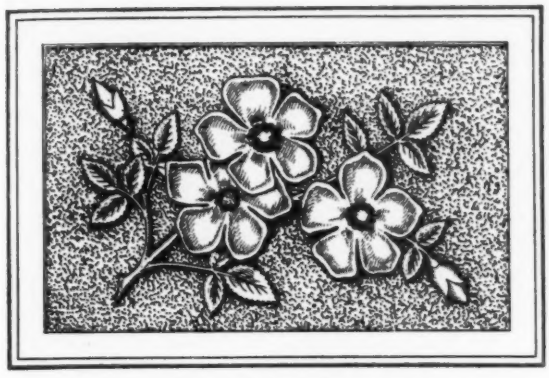


FIGURE 5. DESIGN FOR JEWEL BOX, TRAY, OR HANDKERCHIEF BOX.

Personally, teachers may or may not care for carved furniture; however, in this day of antiques and reproductions, a certain amount of it is absolutely essential. Don't think that it is necessary for a teacher to be a wood carver in order to teach a little wood carving. It is not, provided the teacher is willing to take the tools and work right with the boys. He should not be afraid of making mistakes before the boys at it will not lower him in their estimation.

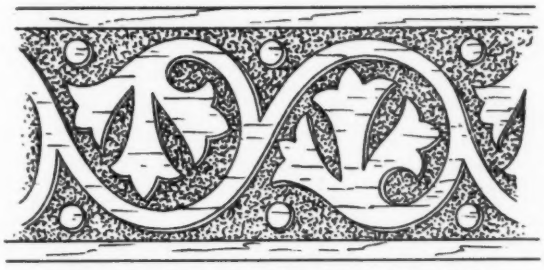


FIGURE 6. DESIGN FOR BORDER OF FLAT CARVING.

The designs which may be used are unlimited and may be drawn from almost any source of nature and modeled to fit the particular piece it is intended to adorn. The accompanying sketches include a few of the designs which the writer has found useful in his classes. The design in chip carving may be varied to almost any form and may be done with only a skew chisel or a pocket knife. The flat border design is simple wood engraving, with the background stippled. In the wild-rose design on the clock case, and a similar one for the jewel case, the work is carried a step farther and leaves, petals, and buds are modeled. More intricate and difficult carving is shown in the book ends and the carved table.

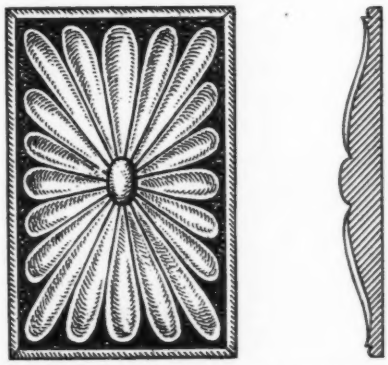


FIGURE 7. CARVED ORNAMENT FOR LAMP COLUMN, ETC. (See Fig. 8.)

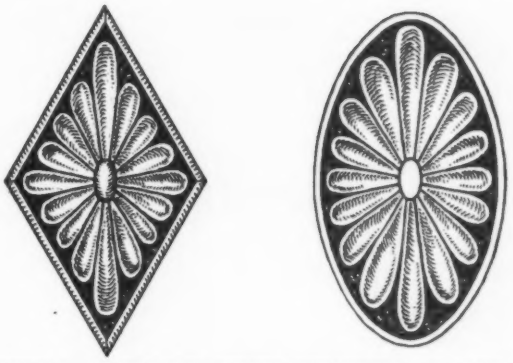


FIGURE 8. DESIGNS FOR CARVED ORNAMENTS FOR LAMP COLUMNS, TABLE LEGS, ETC.

IMPROVING ART EDUCATION

"In some sections of the country art education is in a state of Jazz," said T. M. Dillaway, director of art education in the Philadelphia schools, in an N. E. A. address. "Too much attention is given to making something sensational in order to sell the idea of the value of art education to the public. The great impetus which poster-making received during the war seems to have given a false basis for teaching art in the schools. The designing of a poster is a problem which is within the ability of very talented pupils only. When we place commercial art as the goal of appreciation, we ignore the greatest art achievements that man has produced, viz., architecture, painting, and sculpture." He added:

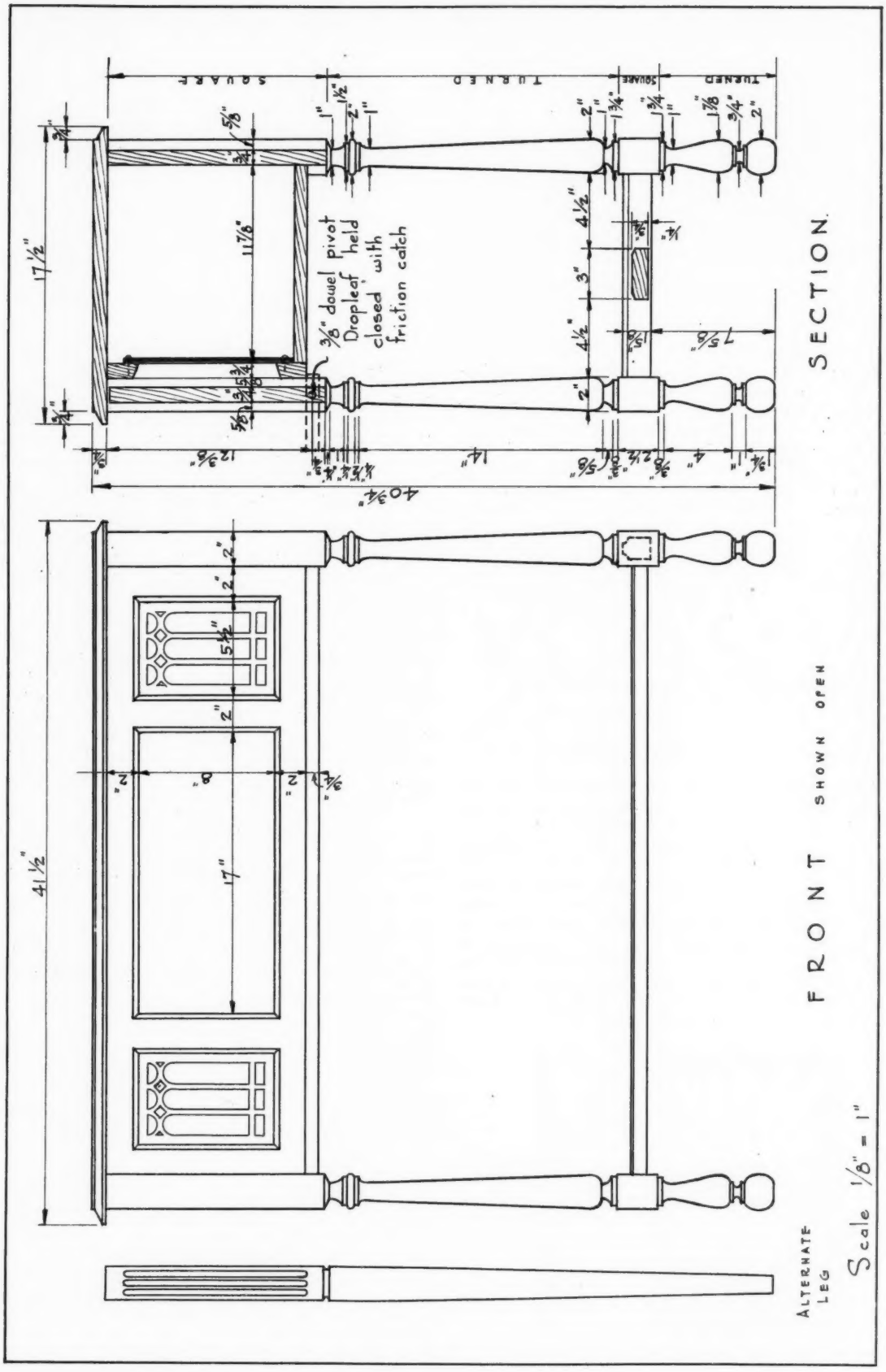
"In the elementary grades less time should be given to doing stunts with paper cutting and decorating discarded tin cans and bottles with painted designs and more time devoted to teaching the fundamentals of art as a basis for appreciation and aesthetic taste. It is one of the functions of a course in art appreciation to teach the relation of beauty to useful objects, but this should be preceded by the acquisition of definite knowledge of that which constitutes beauty, i. e., harmonious relations of lines, shapes, and colors in a pattern.

"Today insufficient attention is being given to drawing as a means of expressing ideas. This useful power should be developed in every grade of the public schools. Illustrative drawing is the most effective means of developing the observation, visual memory, and imagination.

"Another feature of art study as a means of developing appreciation of art is the great need of illustrative material in the form of color prints of the master paintings, and beautiful objects. The art supervisor or teacher, particularly in smaller communities, is permitted by the board of education to supply the schools with crayons, water colors, and paper, but no provision in the budget is made for illustrative material such as mentioned. This is unfortunate, or it is just as reasonable to expect teachers of literature or music to develop taste in these subjects, without the use of books, as to expect the art supervisor to develop children's taste in art without having them study beautiful objects.

Miss Rose Mary Cologne, of the Colorado Agricultural College, has been appointed head of the vocational home making department at Wellington, Nev.

Mr. Forest T. Selby of Durham, N. C., has been appointed director of industrial education at Charlotte. Mr. Selby was formerly instructor in industrial education at Miami University and holds a B.S. degree given by that institution. From Miami he went to Columbia University where he received the A.M. degree in 1919. After one year in trade teacher-training work at the North Carolina State College at Raleigh, he went to Durham as supervisor of industrial education.



DETAILS OF THE RADIO CABINET.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

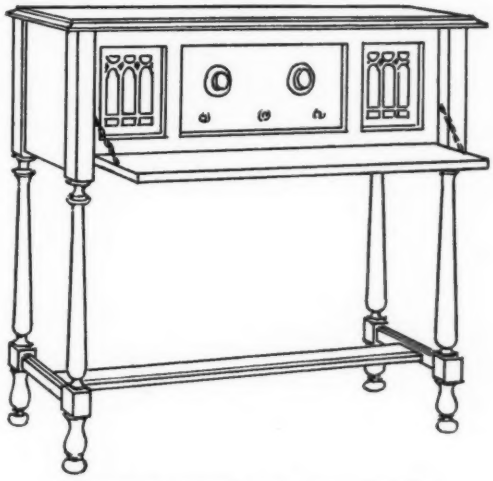
Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

A RADIO CABINET

Gladstone Califf and Arthur Christensen

This design is adapted to the use of almost any cabinet wood. If the alternate square leg is preferred, walnut or mahogany should be used.

The loud speaker and storage battery are contained behind the grilles, two being suggested merely for symmetry of design. The cabinet is deep enough to accommodate all the batteries and the loud speaker if care is used in placing them.



PERSPECTIVE SKETCH OF RADIO CABINET.

The top is hinged at the two rear legs for access to the set. Care must be used in locating the pivot centers for drop leaf so that it will open easily, and the drop leaf should be held in closed position with a friction catch at each end, and should have hinged brackets for support when open. If a lathe is not available long enough to turn the legs in one piece, the turned section can be made separately and doweled to the square parts of the legs.

The end and back panels can be dadoed into the legs or doweled as desired. The joints on the stretcher can be stub mortise and tenon or secured with screws set at an angle from the bottom side.

4 pc.—2x2x40—Legs.
2 pc.—1¼x1⅝x15—Stretcher.
1 pc.—¾x3½x38—Stretcher.
2 pc.—¾x13⅛x36—Back and front.
2 pc.—¾x13⅛x12—Ends.
1 pc.—¾x11⅞x38—Bottom.
2 pc.—¾x2x12—Panel Border.
2 pc.—¾x2x10—Panel Division.
2 pc.—¾x2x36—Panel Top and Bottom.
1 pc.—¾x17½x41½—Top.
2 pc.—6½x9, ⅜ veneer—Grilles.
2 pc.—⅜x3—Dowel Pins.
2 folding shelf brackets.
1 pc. Bakelite panel, 9x18.
1 pr. 1½x1½ cabinet hinges.
2 friction catches, nails, screws, etc.

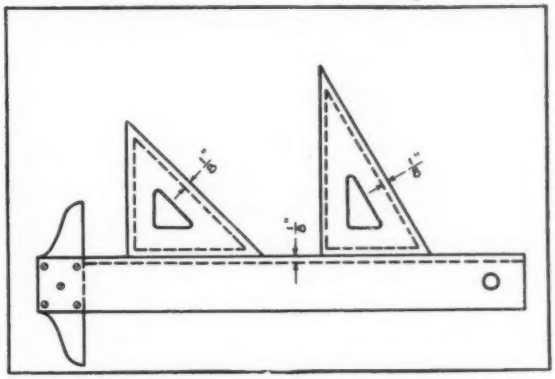
Note: Finished sizes are given except length in which allowance has been made for tenons.

IMPROVED T-SQUARE AND TRIANGLES

William Poloway, Baltimore, Md.

When pupils, beginning to ink a drawing, use a ruling pen, the tendency for the ink to flow under the edges of the T-square or triangles, has caused dislike for inking.

Making a blot, just when the pupil is beginning to realize the fruits of his efforts, brings forth comments of disgust. When the atmosphere isn't cheerful, the pupil's mind tends in another direction other than the drawing room and the teacher's troubles are increased.



IMPROVED T-SQUARE AND TRIANGLES.

With the above facts at hand, the necessity for the improved T-square and triangles was brought about. To accomplish this take a strip of wood ⅛" thick and ⅛" less than the width of the blade of T-square. Glue this strip to under side of the blade as shown by dashed line in sketch.

The same conditions prevail in the use of triangles. Take a piece of wood the same shape as the triangle, ⅛" thick and ⅛" less all around than the size of the triangle and glue the wood to the triangle as indicated by sketch.

Glue pieces of wood to both sides of 30°x60° triangle and only on one side of 45° triangles.

The triangles will rest on the blade of T-square as before, but will be raised ⅛" from paper. This will keep the ink from flowing under the edges of T-square and triangles and will not discourage the pupil.

A SMALL TRUCK

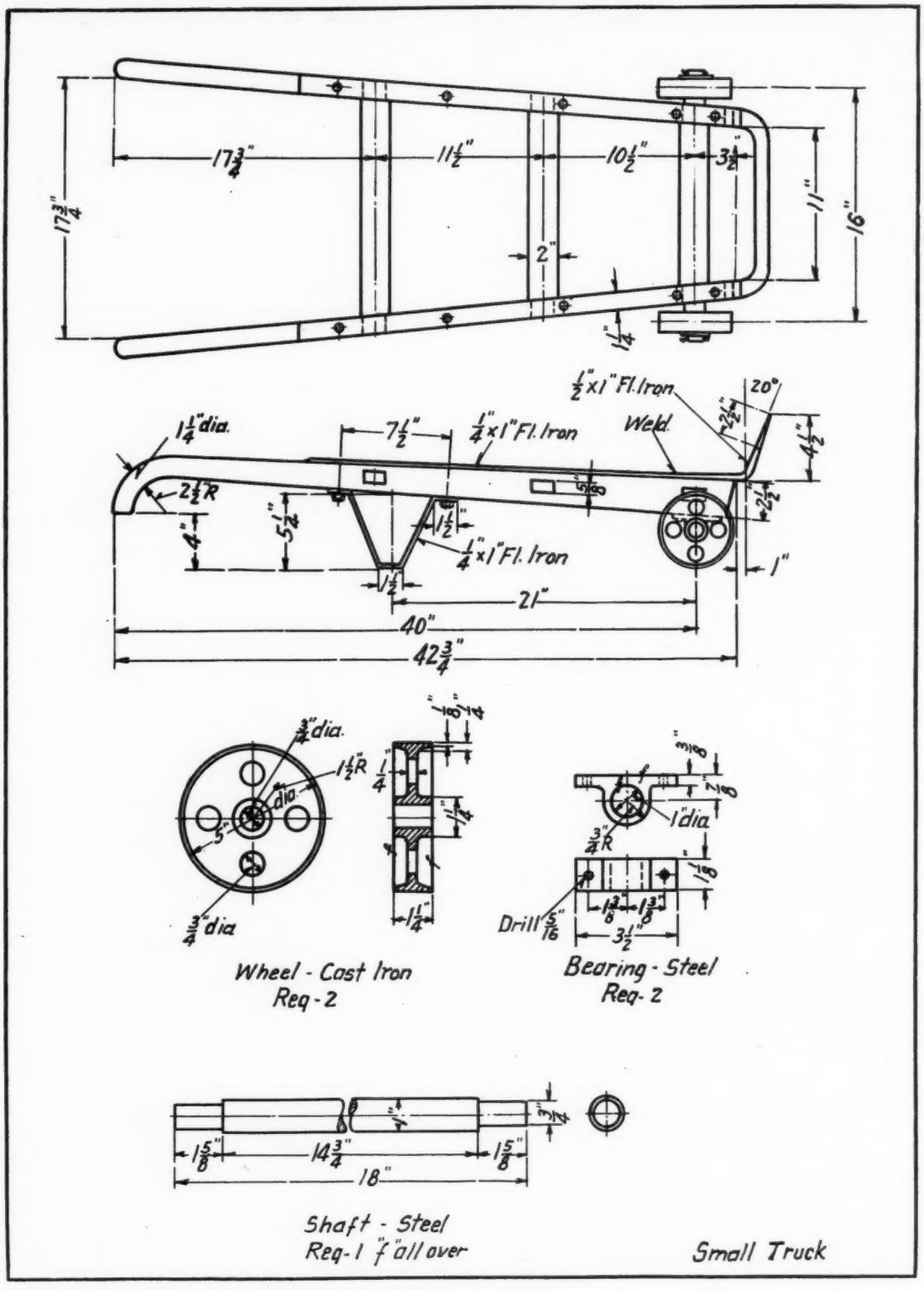
R. J. Anderson and J. A. Miller, New Kensington, Pa.

A useful and interesting project that can be used as part of the shop equipment after completion is the small truck shown on the opposite page.

The wood, pattern, forge, machine shop, and foundry have some work in connection with the project, and yet each shop can complete its portion in a comparatively short time, thereby keeping up the interest of the students.

The two side pieces of oak which hold the bearings and supports in place are tied together by three pieces of oak, 1½"x2". These pieces are reenforced by ¼"x1" flat iron which are held in place by four 5/16" countersunk head machine screws, 2¾" long, passing through the formed supports and by two 2" No. 16 wood screws.

At a point about six inches from the end of the truck a piece of ½"x1" flat iron is welded to the ¼"x1" piece and that part is flattened to a point and made approximately 2½" wide. Another weld may be made in the center of the flattened portion, but it is not desirable if it can be avoided.



DETAILS OF SMALL TRUCK.

Through the ½"x1" portion of the reenforcement, four 5/16" countersunk head machine bolts 2¾" long pass, holding the bearings on each side in place.

The shaft has a fairly good drive fit in the bearings, and the wheels revolve freely on the ¾" diameter. Washers and cotter pins hold the wheels in place.

The bearing may be made of steel or cast iron as desired.

For transporting cases, boxes, etc., from one shop to another a truck of this kind has a decided value in the school.

SMALL ELECTRIC SOLDERING COPPER

C. A. MacMiller, North Hibbing, Minn.

(See Supplement No. 36.)

The projects chosen for a school shop should be of such a nature that they will be of interest to the student because he can connect them with every-day life and the things he sees and uses in that life. One of the things that finds innumerable uses in the home and in the home-shop of the average American boy is a soldering copper. In practically every modern home the boy has access to electricity, and for that reason the electric soldering copper will appeal to him.

The soldering copper described in this article is one that requires only a trifle over one ampere to operate it. It can be used for an indefinite length of time, without turning off the current (for fear of burning out the element or getting the copper too hot), and can be constructed in the school shop with a minimum of machine work, making it a suitable problem for the electrical shop.

The things needed for the construction of the soldering copper shown in the drawing are:

1. Copper rod, ⅜" by 5½" long.
2. Brass tubing (⅞" inside diam. and $\frac{1}{8}$" outside diam.) a length 3½" long.
3. Brass tubing (⅜" inside diam. and ½" outside diam.), a length 4" long.
4. Brass bar (solid) ⅞" outside diam., two pieces $\frac{5}{16}$", or ⅜" in length (for bushings).
5. No. 1—Nicholson file handle—one only.
6. Mica (2" by 3" .003 thick), two pieces.
7. Nichrome wire—No. 26 B. & S. Gauge—exactly 38 feet.
8. Glass beads to fit over No. 26 wire—13 inches.
9. ¼" R. H. No. 4 screws—2 only.

1. Cut all stock to length as shown in the drawing, being careful to get all edges perfectly square.

2. Cut a pipe thread on the ends of the half-inch brass tubing as shown in the drawing. A pipe thread is most suitable for this, but an S. A. E. will do very well if the facilities for cutting a pipe thread are not at hand. Do not use a standard thread, as the stock is too thin to permit this and still retain a reasonable strength.

3. Drill one of the bushings (No. 4 in the bill of materials) for a pipe tap and the other for a ⅜" press fit. For this latter a 23/64" drill will do very well, especially if it has been ground off center a trifle.

4. Assemble the one flange or bushing and the copper rod by driving the latter into the drilled hole in the bushing. Be careful to get it at the right distance from the end.

5. Slot the other end of the copper rod, as shown in the drawing, to permit the leads from the element to pass through the tube and into the handle when assembled.

6. Wind piece of mica around copper rod, getting a snug fit.

7. Make a loop at the end of the wire before beginning the coil so that the leads will be double from element to the handle. By doing this, the carrying capacity of the wire is increased so that the leads will not heat with the element.

8. Wind one layer of wire, placing one turn next to the other (the oxide on the wire will serve as insulation since the difference in voltage between separate turns is so little as to be practically negligible.)

9. Wind another piece of mica over the first layer of wire and then wind another complete layer of wire. If the winding of the element is carefully done, there will be room to wind all of the 38 feet on the copper rod.

10. Double the end the same as the beginning, to prevent heating of the lead.

11. Fasten the end as well as the beginning of the element wire with a couple of turns of iron wire (insulated from the element).

12. Drill the handle as shown in the drawing.

13. Assemble handle, ½" brass tube, and threaded flange or bushing.

14. String beads on the leads for a distance of 13 inches.

15. Pull leads into handle through tube, while at the same time holding the large brass tube in position over the element.

16. Fill the large tube with powdered asbestos, and finish assembly by pressing into place in a vise.

17. Pull leads from the element through their respective holes in handle as shown in the drawing.

18. Skin the heater cord for a distance of 1½", leaving the absestos covering in place on each wire.

19. Insert as shown in the drawing of handle.

20. Twist cord to ends of leads after having polished or scraped off oxide, and set them with the wood screw as shown.

21. Fill holes with sealing wax to prevent shock and loosening of contact.

22. Fasten large tube to bushings with a 1/16" brass pin at lower end and with three 8-32 screws at other end, being careful not to drill through both tubes. The screws at upper end of the tube are to serve as set screws and have their lower extremity set against the thread of the ½" brass tube.

23. In drilling the handle to permit the brass tube to be screwed into it, it is well to make the hole through the spun brass ferrule at the end of the handle large enough to prevent the brass tube from making contact with it. This will help insulate the handle and also the ferrule from the heat developed at the other end of the finished soldering copper, and prevent the possibility of a burned thumb if the copper is to be used for any great length of time.

Things that Can be Taught While Making This Soldering Copper

1. Resistance of various kinds of wire.
2. Insulating qualities of various materials.
3. Insulation that will resist action of heat and why heat robs some materials of insulating properties.
4. Effect of oxide on joints and the use made of it in this case.
5. Ohm's law.
6. Effect of heat on the resistance of wire, and how to calculate amount of wire needed to give a desired temperature.
7. Size of wire needed for efficient heating element.
8. Pointers in mechanics as used by every electrical worker.
9. Heat resisting properties of special kinds of wire.
10. Care in the handling of tools and equipment.
11. Making out a bill of materials.
12. Greater appreciation of the things the student sees about him.
13. Acquaintance with various materials, their uses and the way they are made.

A BOOK TROUGH END-TABLE

A. E. Bidney, Shorewood High School, Milwaukee, Wis.

(See Supplement No. 35.)

The end-table, illustrated and described in the following project, was designed primarily for evening school students who had indicated a desire to construct such a table in Italian Renaissance style. It was the purpose to use it next to a davenport or chair to hold the customary small lamp, and to serve the added purpose of a convenient book trough. The project will prove interesting to junior and senior high school students, and will give excellent training in the use of the usual hand tools.

The table involves no special difficulty in its construction. The photograph and the drawing show quite clearly the graceful lines and the method of construction.

A high grade wood such as mahogany or walnut is preferable and should be well finished. After careful

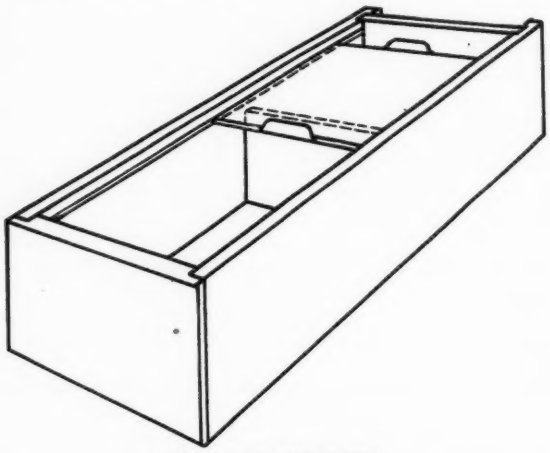
sanding, sponging and re-sanding, stain the desired color and apply a coat of thin, white shellac. After the filler has thoroughly dried apply another coat of shellac, and then two coats of good rubbing varnish. Each coat of shellac should be sanded with No. 6/0 garnet paper and each coat of varnish rubbed with pumice stone and oil, which results in a beautiful satin surface so much desired. Some of the tables were given the regular Italian finish. Any desired finish may be used, depending upon the taste of the individual.

The small table in the photograph was the result of utilizing the parts sawed out. It has a 11½" octagonal top and is 26" high.

"MIXED NAILS AND SCREWS"

A. M. Hahn, Millikin University, Decatur, Ill.

The ever-present problem of keeping nails and screws in their proper places, especially where the drawers are divided into two or more compartments, may be at least partially solved in the following manner. The accompanying sketch shows how a movable, galvanized sheet cover, running in a saw kerf in the side of the drawer, permits the opening and use of only one compartment at a time. In order to get at the desired nail, the boy must cover up those of a different size, and thus prevent the return of unused nails to the wrong box. A drawer with three compartments will require two covers.



A NAIL AND SCREW BOX.

A NEW WOOD TURNED BASE

W. W. White, Waterloo, Ia.

A pleasing variation of the ordinary turned base is described here, with sketches to show the manner of construction. This method is not only applicable to the candlestick shown but is really more successful when used on larger bases, or on such pieces as table lamps, floor lamps, smoking stands, pedestals, taborets, etc. The economy of material and time is a large factor in favor of the design.

A long piece is jointed exactly square and the portions marked for cutting off as shown in Fig. 1. After these pieces are cut to equal lengths, they are glued to the base as shown in Fig. 2. When the glue is set, the assembly is placed on the lathe with the base toward the live center, and turned to any desired pattern. It may appear as though the material would split at each corner, but with sharp tools and a high speed, it will not chip out.

This same method may be applied to a hexagon and octagon, except that the pieces glued on are again square. It makes a design of beauty and richness.

JUNIOR HIGH SCHOOL WOODWORK

Maurice McCann, Richmond, Indiana

It is necessary for every woodwork instructor to teach his beginning students the fundamental operations involved in the construction and design of furniture. An instruction sheet, accompanied by an explanation and demonstration will fix the processes more clearly and firmly in the student's mind.

The use of instruction sheets by the pupils aids in the teaching of different jobs and also helps the shop work function properly. It is practically a necessity in a school where the shop periods are short and the classification of students irregular. The answered questions and the finished job or product form the basis for the instructor's grade.

Two of the most important processes are the squaring of stock to definite dimensions and the constructing of a blind mortise and tenon joint. Both of these instruction sheets have been used successfully in my shop during the past year. The sheet on squaring stock should be preceded by explanations and demonstrations on laying out, cutting stock, and the use and care of bench tools. The following instruction sheets are clear, concise, comprehensive and cover fundamental operations. They may be used in conjunction with reference books.

Instruction Sheet No. 3

Job specification: To square up a piece of stock.

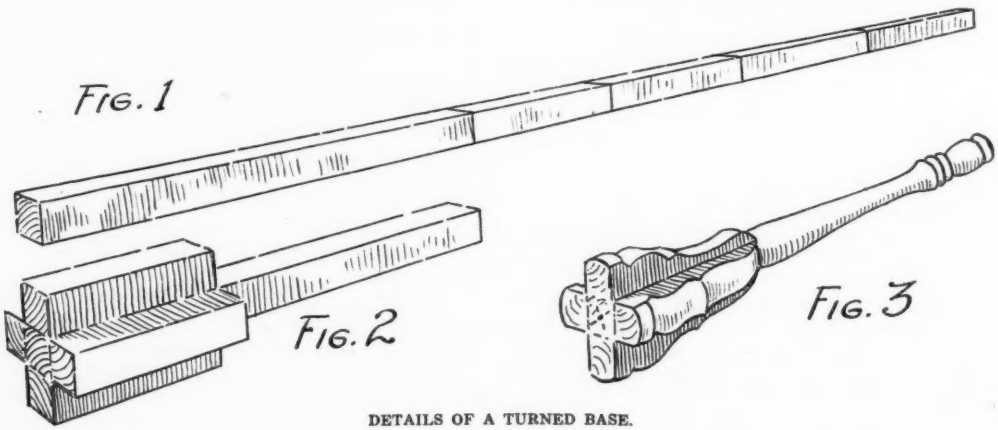
Reason for Job: The fundamental basis for all furniture construction is the necessity of reducing pieces of stock to some definite thickness, width, and length. It is called the process of squaring up and involves six steps which should be memorized and worked out in their proper order. The surfaces must be true, straight, and accurate to a finished size.

Material: Piece of soft wood stock to be reduced to a certain size as designated by the instructor.

Tools: Jack plane, try-square, back saw, rip saw, marking gage, cross cut saw, bench hook, rule and pencil or knife.

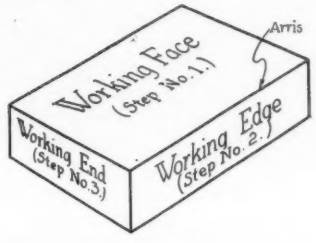
Procedure:

1. SQUARE WORKING FACE.
   a. Choose best face.
   b. Determine direction of grain.
   c. Take correct position at bench and plane.
   d. Test to see if face is level and even.
   e. Face mark when satisfactory.



DETAILS OF A TURNED BASE.

2. SQUARE WORKING EDGE.
   a. Choose better of the two edges.
   b. Test from working face with try-square.
   c. Face mark.
3. SQUARE WORKING END.
   a. Square line across from working edge.
   b. May bevel edge opposite the working edge.
   c. Plane to split the line.
   d. Test from working edge and working face.
   e. Face mark.



4. REDUCE TO RIGHT LENGTH.
   a. Measure necessary length from working end (hold rule along arris of working edge and working face).
   b. Square line across face from working edge.
   c. Saw about $\frac{1}{16}$" over length.
   d. Bevel edge opposite the working edge.
   e. Plane down to required length.
   f. Square end from working edge and working face.
5. REDUCE TO RIGHT WIDTH.
   a. Set marking gage and check with rule.
   b. Gage on face side of piece and hold gage firmly against working edge (use from working edge).
   c. Push gage from you so that spur and line are visible.
   d. Draw gage line across both faces and ends.
   e. Plane to split gage line.
   f. If surface is large remove with rip saw to $\frac{1}{16}$" of the gage line.
   g. Make this edge square with working face.
6. REDUCE TO RIGHT THICKNESS.
   a. Set marking gage and check.
   b. Mark from face side all the way around.
   c. Plane until gage line is split.
   d. Test with try-square.

Note: This instruction sheet should be preceded by demonstrations and lectures on laying out and cutting stock and on use and care of bench tools. It is a problem to help teach a boy to be accurate and also a good test of his ability. These instructions may be applied to the boy's first woodwork problem such as the bread board, window stop, letter rack, broom holder or book rack. Each step in the squaring up process should be checked by the instructor.

References: Wood and Smith's Prevocational and Industrial Arts; Griffith's Woodwork for the Secondary Schools.

Questions:
1. What kind of wood is used in this problem?
2. Why do we square up stock?
3. Why select the best surface to work on first?
4. Why push a marking gage from you?
5. What do we mean by splitting the gage line?
6. What is a true surface?
7. What are the six steps in squaring up a piece of stock?
8. What is the proper position at bench while planing?

Record:

Name..... Class..... Period.....

Date begun.....Date finished.....

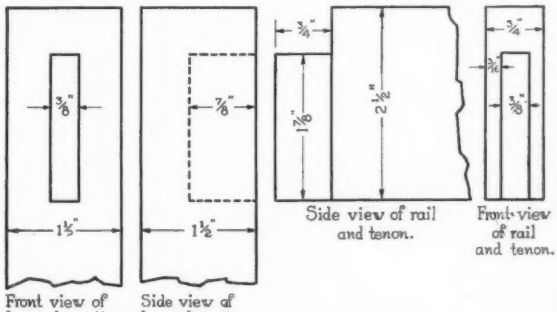
Have you answered all the questions?.....

Instructor's grade.....

Instruction Sheet No. 7

Job Specification: To construct a blind mortise and tenon joint.

Reason for Job: The blind mortise and tenon joint is one of the strongest and most common joints used in furniture and cabinet construction. This joint should be carefully made to obtain a good fit and neatness of appearance. It must be remembered to lay out and cut the mortise first then lay out and cut the tenon to fit the mortise. After the principle of making one joint is mastered, other mortise and tenon joints can be easily constructed.



Front view of leg and mortise. Side view of leg and mortise. Side view of rail and tenon. Front view of rail and tenon.

Materials: Such material as necessary for the job.
Tools: Back-saw, try-square, chisels, marking gage, rule, brace, knife, depth gage, and $\frac{1}{16}$" auger bit.

Procedure:
1. LAY OUT MORTISE (Stock must be square).
   a. Face mark (1) inside and toward bottom.
   b. Measure from bottom or floor.
   c. Measure length of mortise after checking for relish.
   d. Mortises appear on face marks only.
   e. Lay out for width of mortise. (1) Gage distance from the outside face and use same gage setting for all similar mortises.
   f. Gage inside of mortise. (Gage from outside face with same setting as for outside of mortise plus width of mortise.
   g. Square lines across with try-square and lay out all similar mortises at same time. Check before cutting.

Detail illustration of blind mortise and tenon joint.

2. CUT OUT MORTISE.
   a. Bore out ends first with bit $\frac{1}{16}$" less in diameter than the width of the mortise.
   b. Set adjustable depth gage $\frac{1}{16}$" deeper than length of tenon.
   c. Chisel out ends first then the sides. Hold chisel as perpendicular as possible.
   d. Watch gage lines and keep sides parallel.
   e. Take thin shavings and keep corners square.
   f. Use a wide chisel in cutting down the sides.
3. LAY OUT THE TENON.
   a. Face mark (1) inside and towards bottom edge.
   b. Measure length of one tenon. (1) Square line across faces and edges to be cut.
   c. Measure distance between shoulders. (1) Square line across faces and edges to be cut on opposite tenon. (Use this rail as a templet.)
   d. Gage distance from outside face. Use same setting of gage for all similar tenons.
   e. Gage opposite side of tenon from same face with same gage setting plus width of tenon. Use same setting for all similar tenons.
   f. Do not gage past shoulder line.
   g. Test measurements before cutting.
4. CUT THE TENON.
   a. Rip all distances down from ends. (1) Use a back saw and do not saw past shoulder line.
   b. Saw all distances down from faces and edges.
      (1) Knife lines before sawing.
      (2) Take great care to follow the line.
5. FIT THE JOINT.
   a. Fit individual mortise and mark.
   b. Chisel to fit mortise. (1) Chisel across the grain.
   c. Do not force but have a snug fit.
   d. Number mortise and tenon to correspond.

Note: In the construction of the blind mortise and tenon joint the tenon should be about $\frac{3}{8}$" thick three-quarters the width of the rail wide and about one-half the width of the leg in length or long enough to insure strength of construction. This may vary with large jobs and machine work.

References: Wood and Smith's Prevocational and Industrial Arts; Griffith's Woodwork for Secondary Schools.

Questions:
1. Where is the blind mortise and tenon joint most used?
2. Why do we lay out and cut the mortise first?
3. Why do we always gage from the same face?
4. What is the purpose of laying out similar work at the same time?
5. Why must we be careful not to cut the tenon under size?
6. How strong should a mortise and tenon joint be and how is it fastened together?
7. Why is the chisel held up perpendicularly while cutting the mortise?
8. Name and give the use of some other joints used in furniture construction.

Record:

Name..... Class..... Period.....

Date begun.. .....Date finished.....

Have you answered all of the questions?

Instructor's grade.....

VOCATIONAL WORK DIVIDED

The vocational studies, as pursued in New York City, are to be divided into two divisions: Elementary instruction and trade instruction.

It is felt by the board of superintendents that there are two good reasons why this bureau should again be divided—First, the work supervised at present is too broad in scope to be loaded upon the shoulders of any one director, and, second, shop work is not primarily trade or vocational in nature, but rather educational.

The new by-laws proposed by the board of superintendents provide for the establishment of the new position of "Director of Elementary Shopwork" and describe the duties as follows:

"The Director of Elementary School Shopwork shall have charge of all matters relating to elementary school shopwork instruction for boys in all day elementary and junior high schools in which the shops serve the purpose of manual training and in which the instruction is given by teachers holding license as teachers of elementary school shopwork. He shall recommend plans and specifications for the equipment of shops under his supervision and shall recommend the supplies and equipment to be used therein."

The new by-laws substitute for the present section describing the office duties of director of vocational activities, one which limits him to "matters relating to instruction in technical, vocational and industrial subjects in all day, evening, and continuation schools and other school activities."

PROJECT ANALYSIS FOR A TOOL BOX

John B. Butler, Instructor, Gardner, Mass.

Material 28 g. Iron (galvanized or black).

A. **SIDES.**

1. Mark carefully around pattern with scriber.

2. Follow blue print closely and cut one side for front of box and one for back of box. **Note that the notches for hinges are omitted on front side.**

3. Set bar folder at ½" closed lock and fold sides of pieces.

4. With folder set in same position, fold up bottom, taking care to make fold opposite from fold on sides. Do not close this fold. See drawing, Sheet 1, Fig. 1.

5. Set bar folder at ¼", open lock and fold for wire at top. Make fold on same side as bottom fold. Note: Fold may be made on either side with good results.

6. Cut piece of ⅛" wire 18" long and lock metal around it, using wiring machine if possible.

7. With piece of straight wire in place, lay upper side of piece (side fold down) over edge of bench and fold by hand to form rim. (Do not use mallet as metal will take proper shape by careful handling.) Side should then look like Fig. 1, Sheet 1.

8. Place all metal above wire in smooth jawed vise and squeeze metal together. Side should then look like Fig. 2, Sheet 1.

9. Place end of wire in vise and pull out of groove.

Show to Instructor for Inspection.

B. **ENDS.**

Follow analysis, Part A.

Show to Instructor for Inspection.

C. **BOTTOM.**

10. Mark carefully around pattern with scriber.

11. Cut out one piece and with bar folder set at ½" closed lock, fold all sides at right angles.

Show to Instructor for Inspection.

THE FINISHED BOX.

D. **CORNER PIECES.**

12. Mark carefully around pattern with scriber.

13. Cut out 4 pieces.

14. Set bar folder at $\frac{15}{32}$" closed lock and fold sides of piece. (See drawing.)

15. Set bar folder $\frac{9}{16}$" closed lock and fold piece in center in shape of right angle.

Show to Instructor for Inspection.

E. **CORNER WIRES.**

16. Cut 4 pieces ⅛" wire 12" long.

17. Straighten wire on anvil.

18. Bend wire at right angles 4" from one end, in vise.

19. Test angle with square.

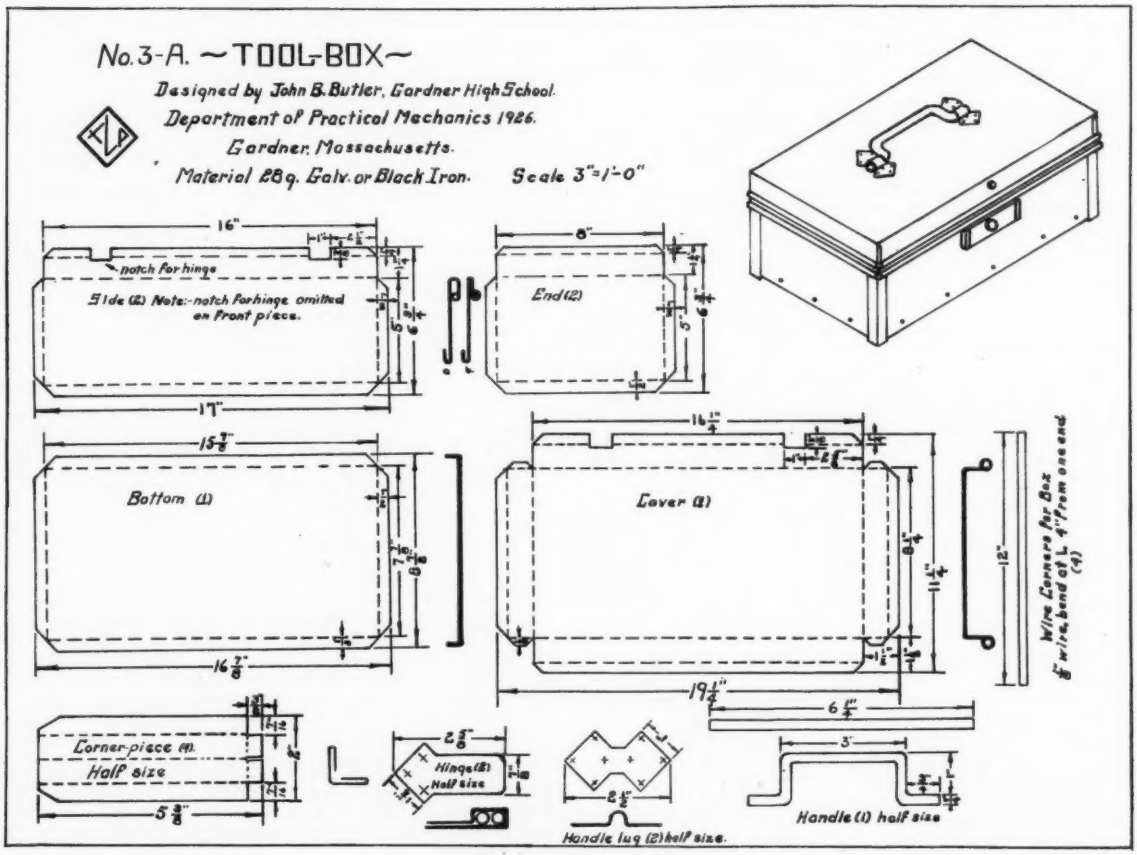
Show to Instructor for Inspection.

F. **BOX COVER.**

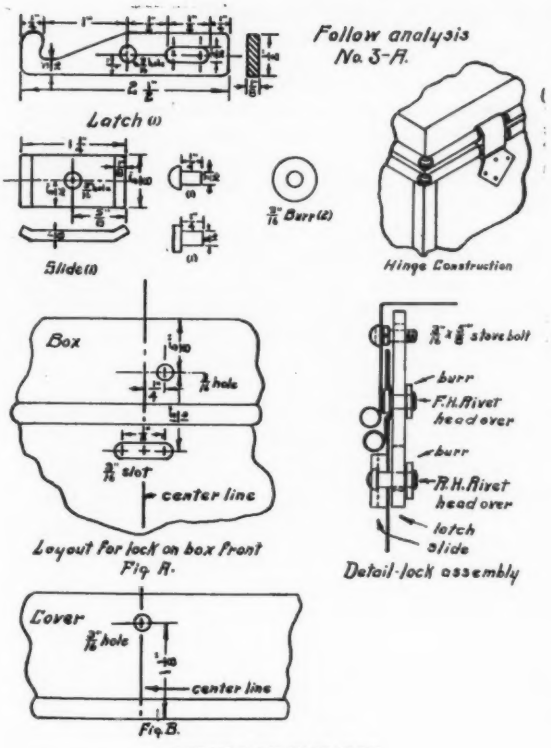
20. Mark carefully around pattern with scriber.

21. Cut out one piece.

22. Set bar folder at ¼" open lock and fold all sides



DETAILS OF TOOL BOX.



DETAILS OF TOOL BOX.

of piece for wiring.

23. Cut piece of 7/8" board 16" long. Be sure that it has a good square edge.

24. Place side of cover over edge of bench, having fold for wire next to bench.

25. Clamp board on metal where it is to be folded and bend up at right angles. If mallet is used, place piece of waste wood between metal and mallet to prevent any possible dents.

26. Do likewise with ends of cover, using smaller piece of board (8" long).

27. Place cover on square stake and bend over flap on each end. (See drawing.)

28. Solder corners on inside of cover. Note: This is advisable but not necessary.

29. Cut piece of 1/8" wire 48" long.

30. Straighten wire on anvil.

31. Bend wire at right angles 6" from one end.

32. Form wire around cover, making it fit tightly and taking care to have all corners square.

33. Close metal around wire, using wiring machine if possible.

34. Test cover on flat surface.

Show to Instructor for Inspection.

G. **HANDLE.**

35. Cut piece of 1/4" iron rod 6 1/4" long.

36. File ends to remove burr.

37. Place piece in vise and bend to form handle. Follow drawing carefully.

Show to Instructor for Inspection.

H. **HANDLE LUGS.**

38. Mark carefully around pattern with scriber.

39. Cut out 2 pieces.

40. Place one end of 1/4" rod in vise in horizontal position.

41. Bend lug around rod with fingers.

42. Remove rod from vise and with flaps of lug between jaws of vise squeeze metal around rod.

43. With lug in this position on rod, place rod in vise and bend flaps at right angles to rod. Follow drawing carefully.

Show to Instructor for Inspection.

I. **HINGES.**

44. Mark carefully around pattern with scriber.

45. Cut out 2 pieces.

Show to Instructor for Inspection.

J. **ASSEMBLING BOX.**

46. With screw driver open inside fold slightly on upper end of corner pieces.

47. Do likewise with bottom corner on side and end pieces. (This will allow corner pieces to slide on easily.)

48. Place corner wires in position.

49. Bend in flaps on bottom of corner pieces at right angles.

50. Slide on corner pieces, one at a time until the lower edge of rim is reached.

51. Lay box on bench, bottom side up, and drive down corner pieces as far as they will go.

52. Place bottom in position.

53. Clamp 2 pieces of wood against bottom to hold it firmly in position.

54. Tighten bottom fold with hand seamer.

55. Fold flaps on corner pieces down in same manner.

56. With clamp still in position draw pencil line 1/4" up from bottom on outside of box. (This line will aid in locating holes for escutcheon pins which are used to hold bottom in place.

57. Lay out points along line when holes are to be made.

58. Place bottom edge of box on lead block and punch holes with prick punch. (Large enough for No. 14 escutcheon pins.)

59. Drive pins in place and set down metal around pin with rivet set, having head of pin on anvil. (To be headed over on inside edge of box.)

60. Cut off pin with end nippers as close to metal as possible and head over.

Show to Instructor for Inspection.

K. **ATTACHING HINGES.**

61. Place cover in position on box and slide hinge between wire on both cover and box; allow enough metal to form over outside of wires. The detail on Sheet 2 will illustrate this step clearly.

62. Form metal around wire as tight as possible. Use edge of double seamer to form shoulder. (Be sure to place box on mandrel before beginning this operation.)

63. Place lead block on mandrel and punch center hole in hinge, using prick punch and making hole large enough for No. 14 escutcheon pin.

64. Repeat steps 59 and 60 of this analysis.

L. **ATTACHING HANDLE.**

65. Lay out center lines on top of cover.

66. Place handle and lugs in position.

67. Punch holes and rivet handle lugs in place.

Note to Instructor: It is well to reinforce cover where handle is to be riveted on. This may be done by placing a piece of metal 8" square (two edges of which are folded over 1/2") on inside of cover. Have folds running parallel to width of box. The extra thickness of metal will prevent any springing of cover which might result from placing heavy material in box.

LOCK MECHANISM

(Study Sheet 2 carefully.)

M. **LATCH.**

68. Cut piece of 1/2" x 1/8" strap iron 2 1/2" long.

69. Trace out shape of latch, using pattern and scriber.

70. Shape on grinder.

71. Locate hole and slot according to drawing.

72. Drill hole and slot. File edges of slot smooth.

Show to Instructor for Inspection.

N. **SLIDE.**

73. Cut piece of 5/8" x 1/8" strap iron 1 1/4" long.

74. Locate and drill 1/8" hole in center.

75. Offset each end 1/8" in vise as per drawing.

76. File corners to remove burr.

Show to Instructor for Inspection.

O. **LOCATING HOLES.**

BOX.

77. Study Fig. A, Sheet No. 2.

78. Locate hole and slot accurately.

79. Drill hole and slot and file edges smooth.

Show to Instructor for Inspection.

Box Cover.

80. Study Fig. B, Sheet No. 2.

81. Locate and drill hole accurately. Note: These holes must be located accurately in order to have cover lock down tightly on box.

Show to Instructor for Inspection.

P. **ASSEMBLING LOCK.**

82. Rivet latch in place, using flat head rivet. Follow drawing closely.

83. Place slide in position and insert round head rivet.

84. Place burr on end of rivet and head over tight enough to hold slide in place and at the same time loose enough to allow slide to work back and forth.

Show to Instructor for Inspection.

85. Place stove bolt in position and try out latch. If it refuses to lock it may be remedied by filing the hook.

86. **Final Inspection.**

A WARDROBE HANGER

Chas. A. King, Plymouth, N. H.

This convenient wardrobe accessory is an excellent project for the pipe fitting class of a vocational school. It requires only ordinary ⅜" pipe fittings, as follows:

1 ⅜" drop tee, double ears.
2 ⅜" street elbows.
3 ⅜" cap ball ornaments.
2 ⅜" pipe, 11½", for hat hooks; allowing ⅜" on each end for joint.
1⅜" pipe, 17½" or less, for suit hanging rod; on each end for joint.

The hanger may be made of ½" pipe and fittings if preferred, either iron or brass. If the latter, the finished project may be given a coat of aluminum or bronze paint.

As the pipe hat hooks must be bent right and left the project requires considerable skill. The joint *a* between the two street elbows should be loose enough to allow the suit hanging rod to be swung either right or left, as may be needed to allow any part of the closet to be reached. This rod should not be more than 18" long on account of the weight of the clothing and hangers it must support. In some cases its length may be limited by the amount of clothing desired to hang on it, in others, by the depth of the closet in which it is to swing.

After the rod has been fitted drill a small hole at *b* to receive a pin which will prevent the hat rod from turning down. When this pin is withdrawn the rods may be turned out and laid flat with the rest of the hanger in a suit case or trunk and easily reassembled. Even without removing the hat rods, the suit rod may be turned back to the line of the hat hooks and easily packed for transportation.

The hangers are suitable for home use and usually two or three will care for the seasonal clothing of two people.

PICTURE FRAMING

C. M. Gilmore, Hazard, Ky.

Picture framing as an incidental to a manual arts course has merits which are by no means negligible. The framing may be made or bought; however, for the sake of the element of time it is better to buy the framing ready for use when it reaches the shop. The only necessary additional equipment for the average shop is a good framing vise.

What are the merits of picture framing? Please note the list below:

1. It teaches harmony. The picture and the finish of the frame should harmonize.

2. It teaches proportion. The size of the picture determines the width of the framing.

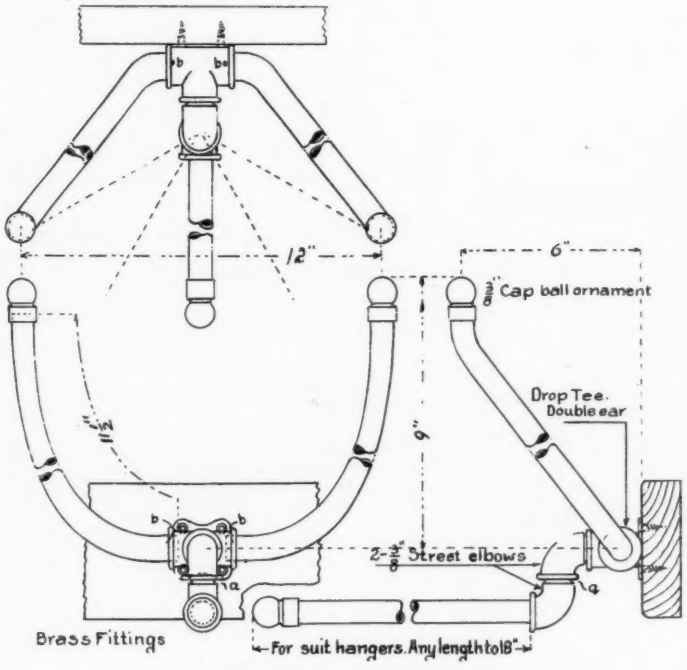
3. It leads to a study of pictures. A pupil framing a picture will naturally observe it rather closely and become inquisitive as to its meaning.

4. It brings home and school into closer touch. Any pupil in a shop above the sixth grade can frame a picture from home and have it ready to hang within a short period of time.

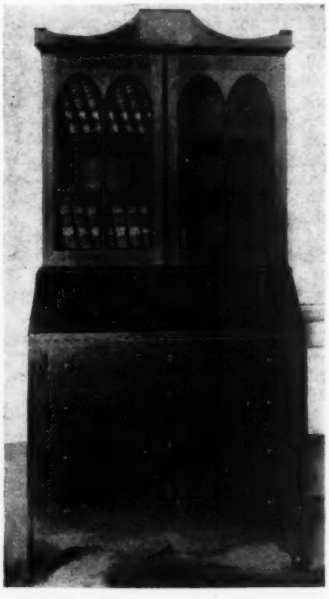
5. It leads to a proper understanding of how pictures should be hung in the home. Pictures are to be seen without the craning of our necks.

6. It enriches the manual arts course and broadens the experiences of the pupils. Picture framing acquaints the pupil with the miter saw, framing vise, hammer, glue, wire brads, glass, glass cutter, picture frame points, screw eyes, picture backing, passe partout hangers, turn buttons, picture cord, picture hooks, mat boards, sealing paper, and gummed tape.

Mr. George F. Saunders, former state supervisor of trade and industrial education in Maryland for the Federal Board of Vocational Education and for the last three years in charge of the educational program at Cumberland, has been appointed to carry on the program in foreman training for the states, and to have charge of such other duties as may be assigned to him as a regional agent of the Federal Board.



DETAILS OF WARDROBE HANGER.



A SECRETARY DESIGNED AND MADE BY STUDENTS OF THE RAMON DE BALDIOTORY TECHNICAL SCHOOL, SAN JUAN, PORTO RICO, UNDER THE DIRECTION OF MR. HERMAN HJORTH.

How Shall We Mill It?

Typical Ways of Handling Various Milling Jobs—III

Howard Rowland

8. INDEX BASE METHODS

Here we have a 180° hand indexing fixture holding three pieces, one above the other at each index position. The regular spindles of the machine likewise have been replaced by three spindle carriers on each head, thus making it possible to mill three pieces, both sides, at one pass to the table. The same fundamental principles of index base milling are employed with the operator standing at his normal position and loading and unloading the work. The machine controls the table movements automatically. The only idle time lost for the table movement is to and from the cutters and indexing of the base. This usually takes about fifteen seconds.

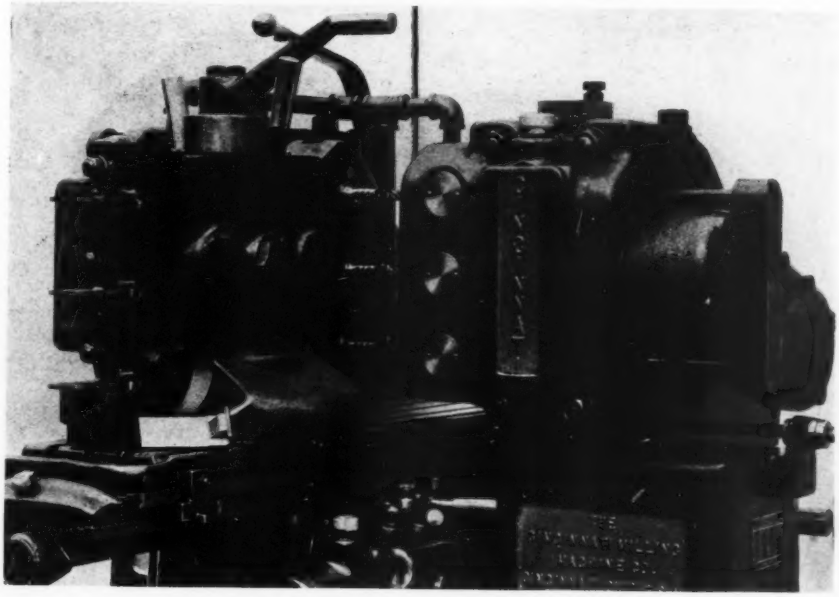


FIG. 8. MILLING BY INDEX BASE METHOD.

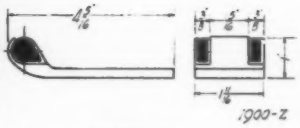


FIGURE 8A.

9. DUPLEX MILLING

Where the piece is too long to go on a standard index base, a single fixture is frequently mounted on the table of the machine. When the machine is a duplex, (having two cutter heads), a fixture is used to hold two pieces abreast as shown in Fig. 9. An additional advantage of putting this sort of a job on an automatic machine is that the space between the bosses is traversed automatically by *quick* traverse and the idle time cutting air thus reduced to minimum. Dogs automatically control this movement, and at the end of the cut the table is automatically returned to the operator for reloading. This is a very fast method of production, handled in an economical manner.

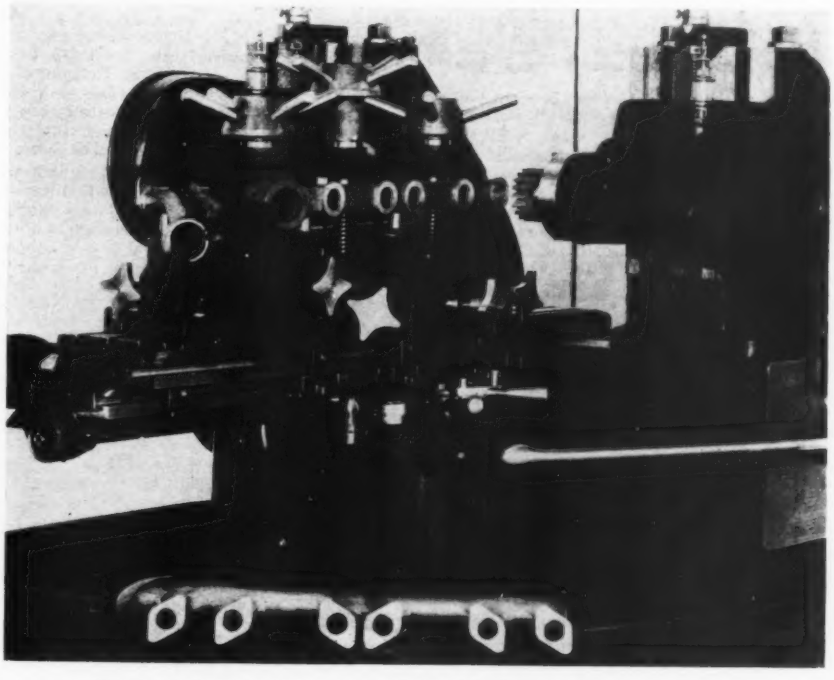


FIG. 9. DUPLEX MILLING OF EXHAUST MANIFOLD (See Figs. 9A and 9B). MACHINE: 24" Duplex Automatic, removing 3/32" stock. PART: Exhaust manifold and water inlet manifold. CUTTERS: 1—3" diameter and 1—3½" diameter fine tooth shell endmills on two shell end mill arbors. OPERATION: Mill pads. MATERIAL: Cast iron. TIME PER PIECE: 2.55 min. FEED: 22.6".

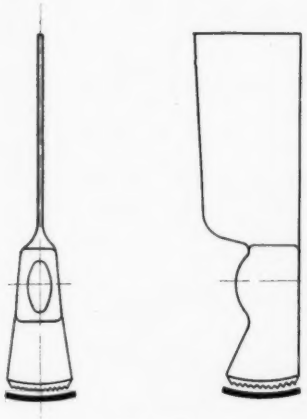


FIG. 10A.

MACHINE: Duplex Automatic, removing 1/8" to 5/32" stock. PART: Lather's Hatchet Head. CUTTERS: 2 high speed form relieved interlocking cutters 4½" in diameter on 2—2" diameter special arbors. OPERATION: Mill serrations on radius of 3". MATERIAL: High carbon drop forge steel. SPEED: 5⅝" per minute. TIME PER PIECE: .72 minutes. FEED: 79 r.p.m.

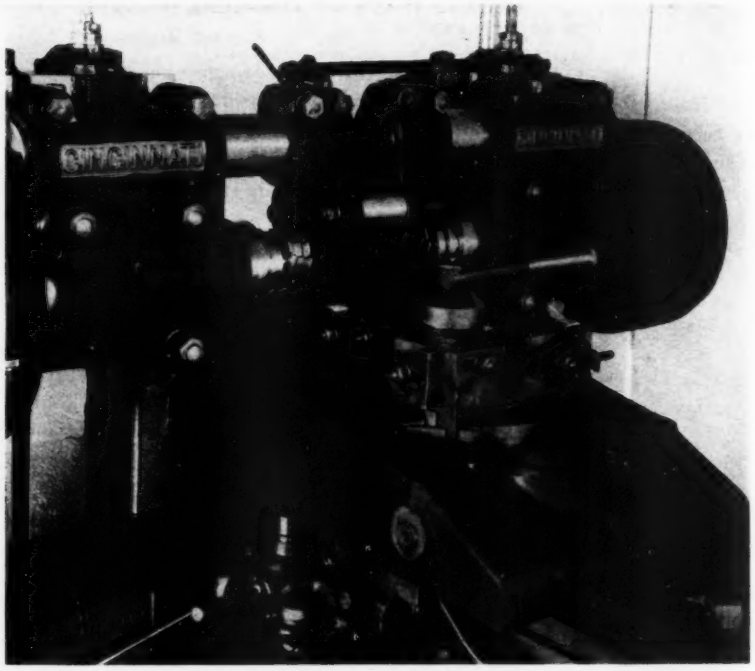


FIG. 10. MILLING SURFACE CURVED IN BOTH DIRECTIONS.

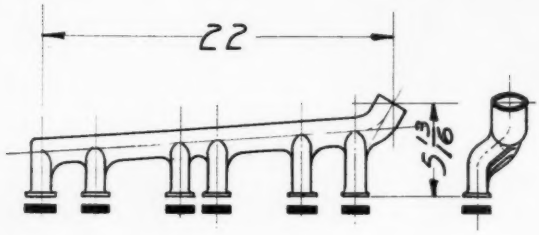


FIGURE 9A.

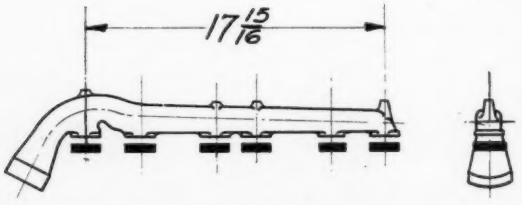


FIGURE 9B.

10. NINETY DEGREE INDEXING

This type of fixture is used where two cuts must be taken at right angles to each other. This particular operation happens to involve also the milling of a curved surface in both directions. This was obtained by having special concave cutters to get the curve in one direction and by automatically raising and lowering the work holding unit along a curved path beneath the cutters. The operator standing at one end, simply loads after removing a finished piece. Two pieces are milled at each pass of the table to the cutters, but since each piece must be finished in two directions at right angles to one another, one piece is finished complete per pass. Each time the table automatically returns, the work is indexed 90° by hand. This method is more or less special but illustrates the way in which a particular job can be handled most economically. (To be Concluded)

A TRI-CITY SHOP TEACHERS' CLUB

Saginaw, Flint, and Bay City are adjoining cities in the state of Michigan, which have many common interests. The vocational schools and the industrial arts departments of the high schools and elementary schools are particularly close through the activities of the Tri-City Club, which includes all the shop teachers of the three cities and the home economics teachers as well.

The Club has no officers and exacts no duties. It holds three meetings annually, one in each of the three cities. The meetings are called in October or November, in January or February, and in May or June. The supervisor or director of vocational work generally takes the initiative in calling the meeting to be held in his community and in fixing the date by conference or correspondence with the supervisors in the other two cities.

The only program which is arranged is an informal discussion, in which anyone may take part, after the noon luncheon. All the shops and classes in the city visited are in full session and the visiting teachers are expected to spend the entire school day in inspecting the shops or classrooms and in observing the teaching. Expressions from teachers and supervisors are to the effect that they gain far more information from the inspection tours and personal conferences than they receive from the average conventions which they attend.

Kalamazoo, Lansing, and Jackson have established a similar Tri-City Club and are finding the plan entirely satisfactory.

Evening Vocational Classes Reopened. The evening vocational school at Southbridge, Mass., opened with courses in mechanical drawing, shop arithmetic, loom fixing, and machine shop practice.

Vocational Course for Boys. The new high school at Hagerstown, Md., offers a vocational course for boys of fourteen years and over. The course is conducted under Smith-Hughes auspices and receives financial support from the state and federal governments.

Offer Shop Courses. The junior high school department of the Belmont Vocational School at Charlotte, N. C., offers shop courses for boys and home economics for girls. In the upper grades, training is given to boys and girls planning to enter some definite trade or occupation. Girls will receive training in millinery, sewing, cooking, cafeteria work and commercial subjects. Boys will be given the fundamentals of trade work, including auto mechanics, carpentry, drawing and sheet metal work.

SHOP TEACHER'S CALENDAR

Time Tasks for November Shop Management—First quarter of school year ends; grades to be made up. Watch heating and ventilation as cold weather sets in. Shop temperature 65° to 68° F.

Instruction—"Carry on" work begun and check related information, correct shop habits, safety rules, etc.

Problems—Prepare materials for projects representing Winter interests—ski, sleds, toboggans. Prepare Christmas projects and limit them to those which can be completed in time.

Community Service—In responding to calls for service, consider the bearing of that service on the educational program.

NEW YORK STATE URGES VOCATIONAL COURSES

The oft-repeated argument for vocational courses in high schools is presented in strong language in a recent letter of the New York State Education Department to all high schools in the Empire State. The letter rather foreshadows a stronger vocational policy which New York is about to adopt. In the letter the state department points out the futility of the continuance of limiting the curriculum to college preparatory or classical courses prevailing in the majority of schools. This, it adds, "is quite apparent when we recognize that approximately 22 per cent of the pupils who enter high school complete the four-year course and that scarcely twelve per cent of them continue their education beyond the high school.

"Those who enter our high schools and who drop out, or if graduated, who do not enter our normal schools, colleges, or universities should receive training that will fit them in so far as it is possible for the work they will do. Obviously it is not possible for all schools to offer all types of courses or to provide training for a wide variety of occupations. Every high school, however, should offer in addition to its college entrance curriculum at least one vocational curriculum for boys and one vocational curriculum for girls.

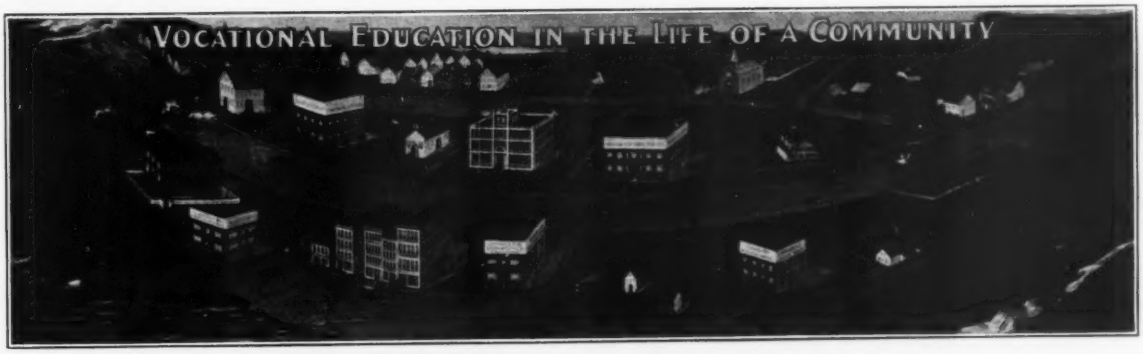
"To be effective such vocational curriculums must represent the dominant occupations of the community and must provide training of such a character that pupils upon graduation may find profitable employment in or near the community. Schools located in regions where farming is a major occupation might well include curriculums in agriculture as a regular part of the school organization. Schools located in communities where the parents for the most part commute to a near-by city for commercial or industrial pursuits would do well to include vocational curriculums in commercial work or in that type of industrial work in which large numbers of the parents of the pupils engage. To offer commercial courses, however, in rural communities that have few if any commercial enterprises, under the guise of fitting for employment, is futile. The future of the rural communities will depend on the training given to those who stay in those communities rather than to those who must go away in order to profit by their training. To set up in a rural community courses designed to train persons for urban occupations is very questionable, both from the point of view of education and sociology.

"At this time we urgently suggest that principals administering the smaller high schools in the state give the matter of the extension of their curriculum offerings serious thought and attention. It is recommended that principals make a systematic analysis of (1) the dominant occupations in the patronage area of the school, and (2) the extent to which persons when vocationally trained may find profitable employment in or near the community."

L. B. TRAVERS,
Supervisor of Vocational Part-Time Instruction,
Oakland, Calif.

Mr. Travers, who recently resigned as western regional agent for the Federal Board for Vocational Education, has been appointed as supervisor of the vocational part-time work conducted by the board of education at Oakland, Calif. The work is largely of a try-out character and involves the training of pupils who have left school to go to work and who are required to take part-time vocational studies a few hours each week.

While in Oakland, Mr. Travers will keep in touch with the work of the Federal Board in Washington and will report on the progress of trade and industrial education in the field.



THE VOCATIONAL EDUCATION EXHIBIT AT PHILADELPHIA.

Vocational education in the life of a community is fittingly represented in a symbolic painting shown at the Sesqui-Centennial Exposition, Philadelphia, by the Federal Board for Vocational Education. The painting, which is hung in the Transportation Building, makes clear that a majority of the citizens of the United States are in three grand occupational groups—agriculture, trades and industries, and home making.

The picture, of which a very unsatisfactory, small reproduction appears on this page, shows factories in operation, buildings under construction, railroads, steamships, orchards and gardens, farms, schools, and homes. Elementary and high schools occupy the center of the group and from these boys and girls are seen going into various fields of activity and into specialized training schools. One building is devoted to the training of young mechanics, foremen, and apprentices, young workers, and trade workers. Another building is devoted to training for successful farming and indicates the opportunities available for vocational agricultural education. The school is located in the suburb where farm boys may avail themselves of practical instruction. A group of business buildings representing department stores, offices, and banks is in proximity to a school for training for store and office employment, salesmen, and other forms of commercial occupation. An important building is devoted to the training of home makers. A building marked Rehabilitation of Disabled Citizens indicates a form of social rehabilitation which is only beginning to be understood.

NOW, ARE THERE ANY QUESTIONS?

Manual Training Books

No. 620. Kindly give me the publishers of the following books (list in answer).—J. V.

A.: House Owner's Book. Churchill & Wickenden. Price, $2.00. Published by Funk & Wagnalls, 44-60 E. 23rd Street, New York City.

Prevocational and Industrial Arts. Wood and Smith. Price, $1. Atkinson, Mentzer & Co., 318 W. Washington Street, Chicago, Ill.

Machine Shop Tools and Methods. W. S. Leonard. Price, $3.50. John Wiley & Co., 43-45 E. 19th St., New York City.

Chucks and Their Uses. Skinner Chuck Co., New Britain, Conn.

An Industrial Play

628. Q.: I would like to know where I could obtain the play, "White Collars."—J. R. H.

A.: The pamphlet, "White Collars, an Industrial Fantasy," may be obtained from Mr. M. C. Richmond, the author, in care of the Atlantic City Boys' Vocational School, Atlantic City, N. J.

Plans for Boats

Q. 630. Could you please inform me where I can secure plans for building a canoe and a speed boat? These projects are for manual training shop work.—H. F. M.

A.: Plans for building canoes, speed boats, etc., can be obtained from the Rudder Publishing Company, 9 Murray Street, New York City, and from Forest and Stream, 9 East 40th Street, New York City.

TECHNICAL TEACHERS HOLD IMPORTANT MEETINGS

The technical arts teachers of San Diego, California, held an exceptionally valuable meeting on Thursday, September 16th, supervisor P. H. Heron presiding. Principal Glen O. Perkins of the Senior High School who spoke, complimented the vocational teachers on the keen interest shown in their work. He believes the most important work lying ahead of the vocational instructors is research study. He emphasized that the teacher must be of an exploratory frame of mind. Shop work, he said, is still in the exploratory stage, and courses that fit the particular needs of San Diego boys should be arranged.

San Diego's new superintendent, Mr. William John Cooper, expressed a deep interest in vocational programs. He believes in liberalizing shop subjects, helping the boys and girls to interpret the age in which they live. As this is an age of machinery, Superintendent Cooper believes that the period can best be interpreted through the mechanical subjects. Secondly, he advocates an intensive vocational survey, in order that teachers may know the real problems of industry and then offer the training actually necessary to meet those problems.

Supervisor Heron urged that a cooperative plan be worked out, whereby boys in the technical department would spend each alternate week in actual work at their trade in the various industrial plants of the city. He pointed out many advantages of the plan, expressing the hope of its future adoption, and pointed out the freedom from accidents that the San Diego school shops have enjoyed in past years.

Mr. Clarence E. Romer, printing instructor in the San Diego senior high school, gave a report of the State Convention of Technical Teachers, held August 9th and 10th at Huntington Lake, California, concluding with a recommendation for more uniform courses of study in the technical department. Mr. Aylett D. Clark gave a short report of the work being done in the shops of the Woodrow Wilson junior high school.

Supervisor Heron then adjourned the meeting. Refreshments and a social half hour concluded the program.

ALABAMA VOCATIONAL SCHOOLS

The Alabama boys in the agricultural farm classes report an earning of $508,726 for the year 1925. The Anniston Star in commenting on this fact says:

"The boys who have added half a million dollars to the gross farm income of Alabama in one year are showing what can be done through systematic and advanced farm work. They are fitting themselves to be the farmers of Alabama in the future and they will be equipped when that time comes to be successful farmers. There will be less going away from the farm to the town when the farm boys realize that success on a farm is as profitable as success in the average business or industrial enterprise in the town, and that the life of a successful farmer is the most satisfactory life a man can lead.

"And not only are the farm boys of Alabama progressing in worth-while knowledge of rural work, but the girls of the farm girls' clubs and the women of the home demonstration clubs are gaining quite as valuable knowledge through the assistance and training of home demonstration agents and club workers."

A USEFUL ALPHABET BY W. BEN HUNT AND ED. HUNT.

THE INDUSTRIAL ARTS MAGAZINE

Volume XV DECEMBER, 1926 No. 12

The General Metal Courses at Stout Institute

C. A. Bowman, Director, School of Industrial Arts,
Floyd L. Keith, Instructor in General Metal Work and Sheet Metal Work

AS an industrial teacher-training institution, Stout Institute carries on a careful analysis of trends in educational administration, in pupil classifications, and in industry. It is its plan to have industrial teachers available at the time they are needed ready to do the necessary work. In order to do this, it is necessary that the men begin their training three or four years prior to the time they are needed. Current practice in the classifications of pupils in junior high schools, senior high schools, and vocational schools now gives rise to a number of legitimate pupil groupings whose instruction brings up the need for a general metal shop. Fig. I is a view of the general metal shop at the Stout Institute from the northeast corner. Some of the forging equipment is indicated, also the machine shop equipment and sheet metal. A bench unit showing vises and bench drill is also included. The especially constructed footing is indicated in the floor where provision has been made for the addition of a power hammer. There is a service door leading direct to the delivery alley, and demonstration seats are arranged in the center. The latter are hinged and swung up when not in use, thus clearing the floor for assembly purposes. The room is lighted on two sides, the lighting being strengthened through the treatment of walls and ceiling.

In Fig. II is a condensed graphic lay-out of situations in present trends, which result in classes composed of pupils in several groupings. The distinctness in pupil classification brings increased clearness in the designation of pupils' work. In the selection of work from a group of occupations, certain parts fit some groups, certain lines of emphasis are stressed for one classification and minimized for another. Certain parts of so-called trends are needed in modern realignments in new occupational groupings, and individual differences may be recognized in varying rates of shop progress. In the first level in Fig. II, a condensed representation of the various *pupil groupings* is made. The arrangement is listed to make possible the tracing of members in mixed classes to their classification as pupils in school. The second level-headed *classification of en-*

FIGURE I. GENERAL VIEW OF THE STOUT GENERAL METAL SHOP.

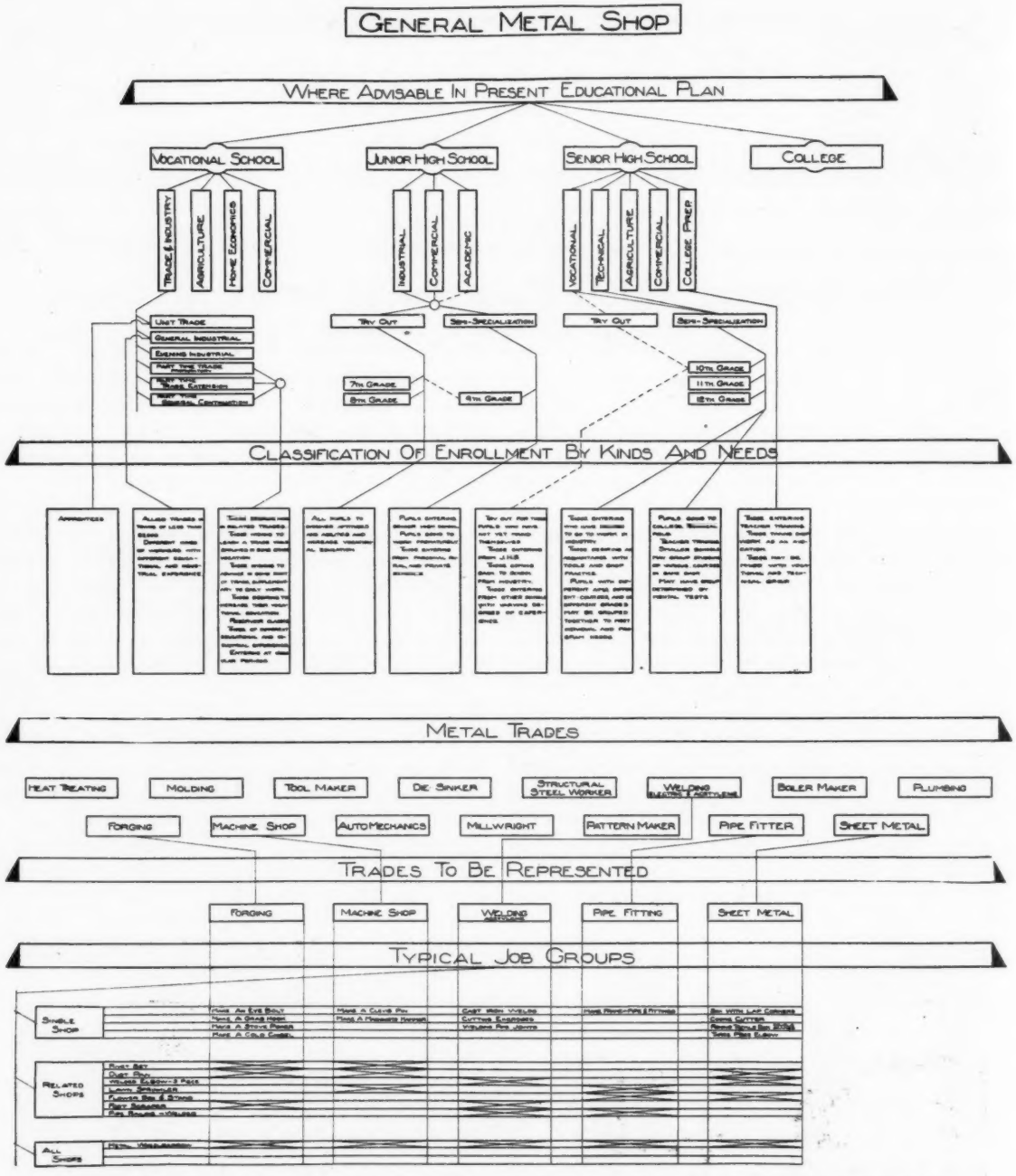


FIGURE II. ANALYSIS OF THE POSITION, ETC., OF THE GENERAL METAL SHOP IN THE EDUCATIONAL PLAN.

rollment by kinds and needs lists some typical groups likely to be sent to shop classes. In each instance, lines are traced back into the first level indicating where each mixed group originates in standard classifications. The classes are made up of several groups for a variety of reasons. One frequent basis is that of groups representing different periods of progress, some having been in a number of times, others for less time. Another basis of difference may be that of previous experience before entering the class. Still another basis of difference may be classification by objectives, with a class from a given grade, but made up of students from several different groupings by courses. Classes have come to be recognized as mixed due to intelligence classifications.

In Fig. VII is a floor plan of the general metal shop. In this shop, classes are operated from the several groups of men in taking teacher-training. There are also senior high school students taking courses in general metal work under the instruction of Stout third year men doing supervised practice teaching. The requirement is made that for purposes of teaching background, Stout students must supplement work in the

FIGURE III. A TYPICAL GENERAL METAL SHOP IN A SMALL TOWN.

general metal shop with additional courses in the machine shop, sheet metal shop, foundry, auto mechanics, shop and drafting room.

The third level in Fig. II, has a condensed grouping of trades involving metal work. In the fourth level is a suggestive arrangement for the selection of certain trades to be represented in the general metal shop. This arrangement facilitates the checking of typical job groups in the next level. In routing students through a general metal shop there is necessity for careful management. In scheduling the students for work in the general metal shop, and in carrying on the instruction, recognition was first made of job groups by single trades. In the first group of the typical job groups, suggestive listings are made of jobs which keep the student within the equipment and processes of a single metal trade. In the second group are some suggested assignments of work which require the student in meeting his assignment of work to work in two, or possibly three metal trades. The trades involved are indicated in the check opposite the specification in the job. In the third group of jobs are specifications in which the student works virtually on the general shop basis. Completing his assignment of work, it is necessary for him to work within the processes, and to use the equipment of most or all of the metal trades represented in the shop. The jobs listed are suggestive to show possible methods of recording.

Scattered over the country some years ago were many small blacksmith shops. These become so-called garages in many instances. In many communities we now have a general metal shop. Rapid growth of the use of the automobile has aided in the development of the general metal shop. Auto mechanics from the standpoint of repair calls for a worker skilled in a number of things essential in the trade of the auto-mechanic, and also a number of things from several other trades. In other words, the auto-mechanic is the possessor of a composite trade. Many of the maintenance shops of large corporations are illustrations of a general metal shops. Figs. III and IV show the exterior and interior of a typical commercial general metal shop as found in the medium sized cities. The breadth of work in such a shop includes the straightening of axles, the welding of springs, the welding of broken casings, the fitting of bushings, the forging of broken brackets, etc. This shop also handles general forge work but no horseshoeing.

FIGURE IV. INTERIOR VIEW OF A GENERAL METAL SHOP IN A SMALL TOWN.

FIGURE V. ANOTHER VIEW OF THE STOUT SHOP.

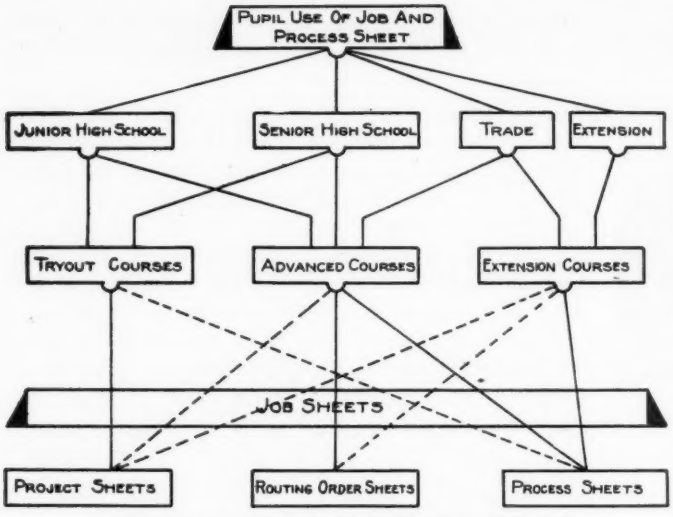


FIGURE VI. TRENDS IN GROUPING STUDENTS, ETC.

Occasionally such a shop, due to an increased demand for some metal part, finds it necessary to put such work on a production basis at least for the time being. In the shop illustrated such is the case in the production of stake hangers for logging cars.

In the increase in mechanical conveniences in vocational, avocational, and home environments, the present range of conveniences is made possible through large production in modern industry using specialized workers. The maintenance and repair of these conveniences has brought about the need of a worker with considerable breadth in skill and knowledge.

The analysis of calls for teachers at Stout Institute has shown an increased demand for teachers in general metal shops. Calls for such teachers have included teachers of general metal working on the try-out basis for junior high school boys; teachers of general metal working for senior high school students many of whom have returned for advanced work following up an initial try-out course, some of them planning to enter industry, others using it as a part of their educational work in preparation for further schooling; and the teachers of part-time, full-time, and evening classes in general metal working in the vocational school. Students in industrial teacher-training take a four-year teachers' college course. Stout students may elect work in general metal in the second, third, or fourth year of the course. Work in the general metal shop includes instruction in actual shop content and in shop management as well. A considerable number of each year's student body is made up of journeymen. Frequently journeymen from some metal trade elect to take courses in general metal to secure an acquaintance with the school shop management of a general metal shop.

When the students enter the general metal shop they are divided into groups that may be easily handled in each division of the shop. They spend a definite period of time in each line of work offered. One man is kept in the tool room for two days. One man acts as shop foreman for the same length of time. This man oils all the machines, keeps the open stock in order, starts all of the large motors, turns on the acetylene and oxygen, keeps the shop in order, and reports breakage or shortage. In changing the groups from one line of work to another, they are shifted so that half of each group moves on to new work, while the other half remains with the new students coming into the group. The system works better than when the total group is shifted at one time. The students taken out of a group to serve as toolroom keeper and shop foreman are replaced by two students who have already served in these capacities. This makes possible the holding of part of the students in each line of work. The toolroom keeper checks out all of the tools used by the students and charges them to the individual who draws them out. He also checks them in at the end of the period and keeps the tools in order, keeps the toolroom clean, oils the tools that need it, when time permits sharpens the tools, checks up on breakage and loss, keeps the record of supplies, and keeps a want list. The entire group of students is held in the shop until the toolroom keeper's record is clear. All of the tools used in the shop in the different lines of work are kept in the toolroom. There are very few tools that are used as general tools in the shop. Small supplies such as bolts, nuts, and rivets, are kept in the toolroom.

There are benches located at vantage points in the shop. Near the machine shop equipment is a bench with vises and a small drill; a similar equipment is adjacent to the forges, and a vise is attached to the sheet metal bench. Distributing the vises and benches throughout the shop eliminates unnecessary travel. The demonstration seats are conveniently placed on the ends of the stock rack. The position of the seats gives access to the forge for demonstration, to the welding and cutting torches, and serves in the place of a lecture room. The seats as indicated in Figs. I and V, when not in use may be elevated, leaving the floor clear for assembling purposes. As the main stock rack does not hold the accumulated short stock, a rack has been built on the top of the coal bin to take care of the short bar stock. The rack is conveniently located for work using bar stock. The rack for sheet metal which is on the wall near the sheet metal machine holds the different metals used. The grinder used for forging, welding, and machine shop work is conveniently located for all students. Near the heat treating furnaces is a quenching tank supplied with running water. The tank is so located that articles may be quickly taken from the furnace and quenched. Oxygen for use in oxy-acetylene welding is supplied from cylinders, and the acetylene supply is furnished by a 100-pound generator located in an acetylene house outside of the shop. The acetylene from the generator is piped into the building, with a shut-off valve where the

pipe enters the shop. The pipe is carried over to the torches with a pressure gage on the line.

The heavy bar stock is placed in a rack near the hacksaw, and the small bar stock in a rack near the shear. A slop sink of large size is placed so that water may be drawn off in pails to supply the water tanks on the forges. Fig. V is a view of the shop from the northwest corner. At the left is a corner of the tool room showing the convenient location of the grinder, hacksaw, and shear for bar stock.

The range of equipment, together with the flexibility in shop operation lend themselves to the operation of junior high school try-out work. A maximum range of metal working contacts is available at a minimum expense. For senior high school classes, sufficient equipment is available for following up try-out courses along any one of the several metal trades represented for individual specializing. The shop is adapted for handling the senior high school elective selections where the subsequent use of the content will be primarily avocational. The makeup of extension classes, either day or evening, calling for several phases of metal work, is such that the general metal shop is becoming the only means of handling such groups.

In the administrative classifications of pupils in junior and senior high schools, where recognition is made of pupil objectives and mental ability as well as years in attendance, there is an increasing tendency to send classes to school shops, such classes being made up of students desiring metal work, but including several types of students. The teacher of a metal work class of 20, has a mixed group, because of pupil classifications. The general metal shop is a type of shop which enables the teacher to solve this problem.

Fig. VI is a graph showing the trends in groupings of students, courses, and types of instructional material. As has been stated, general metal shops are coming into use in the instruction of junior high school students, senior high school students, regular trade students, and extension students. In the handling of work, try-out courses, advanced courses, and extension courses are operated in the general metal shop. Job sheets of the several types are necessary including project sheets, routing order sheets, and process sheets.[1] Lines of relationship between the three levels in Fig. VI indicate probable groupings, try-out courses as a rule being made up of junior high school pupils, and in some instances tenth grade senior high school students. The advanced courses are made up of students from the senior high school, with some from the ninth grade in the junior high school, and some from the trade groups. The extension courses are made up of students from the trade and from the extension classifications in part-time day and evening industrial work.

In the use of instructional material, the try-out course as a rule calls for project sheets with an occasional use of process sheets as indicated by the dotted line. The advanced courses call for the use of routing order and process sheets and some use of the project sheets. The extension courses bring the need of the process sheet with some demand for routing order and project sheets.

In the selection of equipment, the probable pupil groups to be handled in the shop, as well as the trades needed, must be considered. In the Stout Institute shop sheet metal, machine shop, oxy-acetylene welding,

[1]See article on "Graphic Aids in Orienting the Job Sheet in the Shop Lesson," Industrial Arts Magazine, September, 1925, Clyde A. Bowman.

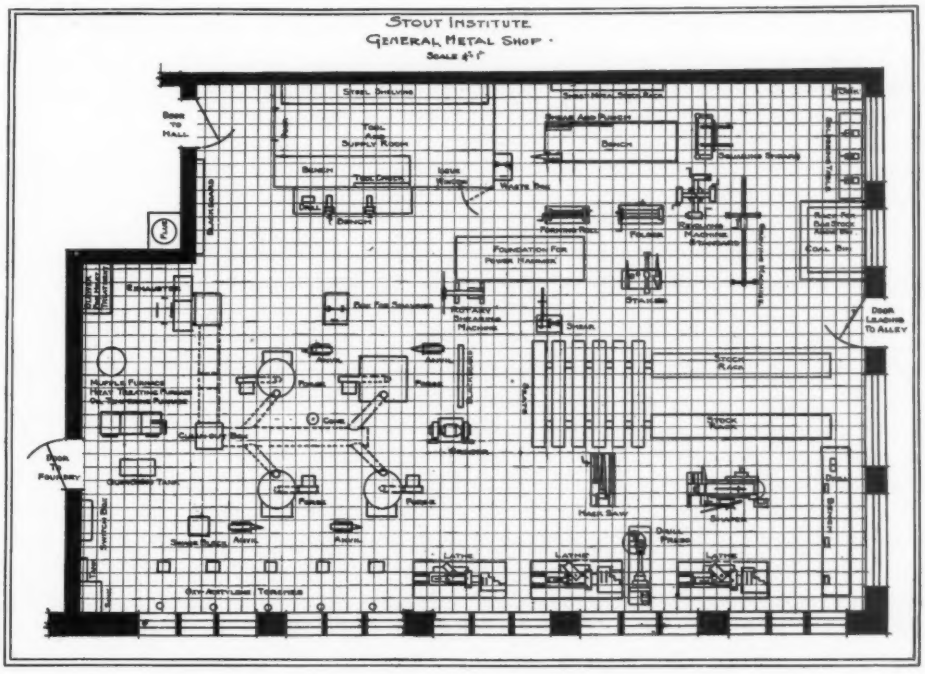


FIGURE VII. LAYOUT OF THE STOUT GENERAL METAL SHOP.

forging, and heat treating are represented. Provision is made for the necessary bench work in the several phases of metal working. In certain communities it is possible that a different selection of individual metal trades is desirable and feasible.

Forging

4 Down-draft forges
4 Motor driven blowers
1 Exhaust fan and motor
4 100-lb. anvils
4 Anvil stands
1 Coal bin
1 Swage block and stand
1 Shear for bar stock
1 Bench
1 ⅜" Bench drill
1 Bench stand for drill
2 Vises
4 Sets forge tools
1 Cone
1 Shaving container
1 Slop sink
2 8-lb. Sledge hammers
6 2-lb. Ball-peen hammers
1 Large motor driven grinder

Sheet Metal

1 Squaring shear
1 30" Bur folder
1 30" Slip roll forming machine
1 Grooving machine
1 Revolving machine stand
1 Crimping machine
1 Wiring machine
1 Beading machine
1 Turning machine
1 Large burring machine
1 Small burring machine
1 Elbow edging machine
3 Johnson single runner gas furnaces
1 Soldering bench
1 Combination punch and shear
1 Large forming roll
2 Benches
3 Bench plates
1 Vise, 1 anvil, stakes
Conductor, beak horn, double seaming, creasing, hatchet, candle mold, blow horn, bevel edged square, round head
1 Stock rack
1 Sink
6 Pair straight blade snips
2 Pair curved blade snips
1 Dozen hollow punches
6 Pair 8" dividers
2 Circumference rules
6 12" Steel squares
2 Sets hand groovers
6 Riveting hammers
6 Setting hammers
3 Marble slabs
4 Pair 3-lb. coppers
1 2-ft. Steel square

Machine Shop

1 Shaper, 20"
2 Machine lathes
2 Independent jaw chucks
1 Bench
3 Vises
1 Stock rack for bar stock
1 24" Vertical drill
1 ½" Bench drill and stand
1 High speed hack saw
1 Waste can
1 Waste container

Two Sets—

1 Straight Armstrong tool holder
1 6" Monkey wrench
1 Facing tool
1 Boring tool
1 Lathe centering tool
1 Pair 4" inside calipers
1 Pair 4" outside calipers
1 6" Steel scale

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1 R. H. Armstrong tool holder
1 Cut-off tool
2 Threading tools V. & U. S. S.
1 Square threading tool holder and cutter
1 Armstrong boring bar, ½" and ¾" bars
1 12" Combination square and centering head
2 Pair spring dividers
1 Pair thread calipers
1 Bolt clipper
2 Pair wire cutters
1 Set machine screw size drills
1 Set standard straight shank drills up to ½"
1 Set taper shank drills ¼"—1¾"
1 Dozen counter brushes
1 Dozen ⅛" drills and countersinks
¼ Dozen file brushes
1 Doz. assorted machine screw taps
1 Set standard taps and dies ¼—¾

Oxy-Acetylene Welding

1 Generator, 100-lb.
6 Welding torches and assembly
2 Cutting torches and assembly
5 Welding tables
1 Preheating torch
1 Preheating furnace
1 Dozen lighters
6 Pair goggles
2 High pressure gauges
6 Low pressure gauges

Heat Treating

1 Combination gas furnace
1 Pyrometer
1 Thermocouple
1 Oil tempering furnace
1 Thermometer for oil furnace
1 Motor driven blow for furnaces
1 Quenching tank with running water

In the listing of equipment, that which is essentially the equipment of a single trade is listed under the name of that trade.

Score Card for Teachers of Manual Arts to be Used for Self-Rating or by Supervisory Authorities

Second Article

H. W. Schmidt, Supervisor of High Schools and Manual Arts, Department of Public Instruction, Madison, Wis.

III. Professional Equipment

This topic pertains to the general training the teacher has received for the profession of teaching and to certain specific attitudes toward professional problems which he exhibits because of such training or experience.

A. EDUCATIONAL PREPARATION. It is to be conceded that four years of professional preparation beyond the high school is desirable and to be set up as a standard. This preparation should be received in a recognized and reputable school.

1. *General.* A good share of a liberal education as a background is essential in all forms of teaching endeavor. Curricula which are essentially professional or technical, and which do not offer at least the equivalent of two years of liberal arts should be penalized here.

2. *Professional.* This refers to those subjects designated as "education." In general these include psychology, educational psychology, methods of teaching, practice teaching, and history of education. Probably not less than 20 credit hours should be acquired in these subjects.

3. *Special.* This part of a teacher's professional equipment pertains to special methods, vocational psychology, and content courses in various vocational activities. A thorough knowledge in at least two mechanical lines, and mechanical drawing in addition is considered a minimum.

B. PRACTICAL EXPERIENCE AND TRADE TRAINING. It is more and more apparent that a teacher's ability in manual arts is increased by a first-hand knowledge of trades and some experience here is demanded if an individual is to receive a perfect score.

1. *Application to teaching.* Trade experience should be utilized to good advantage in shortening processes, instructing in trade technique, using practical knowledge in related subject matter, and selecting trade experiences as demonstration material. In scoring this item, the use of trade knowledge shall be in evidence.

2. *As a broadening influence.* Though this item may be treated somewhat subjectively, its presence in a positive direction may be in evidence. An appreciation of economic problems, such as the relations between capital and labor, and a wider vision concerning scientific management, shop organization, and the division of labor, may readily manifest itself in terms of attitudes, knowledge, and shop organization.

C. GRASP OF SUBJECT MATTER. This includes a rather intimate and accurate knowledge of the subject being taught, not only in a mechanical way but as regards related material and the relations between the specific subject and others. It includes the limitations as well as the economic possibilities of the subject. This item should be outstanding in a positive way.

D. ORGANIZING ABILITY. This applies to both shop procedure and related matter. The ability to develop subject matter in a sequential and logical manner is essential to good teaching.

1. *In mass.* This refers to organizing subject matter as a whole in terms of curricula, shop course of study or daily work. It includes the stressing of important items, and the elimination of much that is trite or does not meet either local or individual needs. It also involves "thinking ahead" and planning the work for the whole semester, year or period.

2. *In daily preparation.* The ability to prepare for the more immediate needs of the day's work. This also includes the more abstract phases of teaching: having proper material at hand; fixing in one's mind the work to be accomplished during the day or period and foreseeing so far as possible the needs of the classes. It is essentially "lesson planning" though a written plan is not necessary.

E. USE OF ENGLISH IN CLASSROOM. It seems to be the consensus of opinion that the English of shop instructors may well be improved. The free and easy atmosphere of the shops is somewhat conducive to a similar attitude regarding speech on the part of the teacher.

A well selected vocabulary and the correct, grammatical use of English should be as basic here as in an academic class. Related work in trade and technical terminology, including spelling, may be looked for.

F. RESPONSE TO SUGGESTIONS. No one individual can know all there is to know about any subject. A dogmatic and narrow-minded attitude is out of keeping with the profession of teaching. A willingness to take suggestions, if of a constructive kind, is quite essential. It makes for more effective teaching.

G. ATTITUDE TOWARD EXPERIMENTATION AND RESEARCH. As education is becoming increasingly a scientific subject, open-mindedness toward progress and research is essential. The teacher himself should become a research agent as he has at his disposal the human material necessary for this work. Experimentation with content and method is profitable, if pursued with a definite end in view.

H. PROFESSIONAL GROWTH. Though this is involved in a measure in some of the previous items, it is of sufficient worth to designate it separately. That stagnation is unprofessional and a static attitude on the part of the teacher undesirable, goes without saying; yet evidences are not lacking that many teachers are satisfied to "let well enough alone."

1. *Study* seems to be the means of professional growth as it calls for concentrated effort and is usually directed.

a. *Reading* should be a definite part of extra-school routine. It should not be desultory but rather specific, and not confined to technical matter. A broader field should be encompassed if an individual is to greatly profit. It includes not only book but magazine reading as well.

b. *Correspondence work* is beneficial and is oftentimes the only means of progressive study at the disposal of the teacher. None but first class schools should be patronized.

c. *Attendance at educational institutions* is, of course, most desirable and it is quite usual for teachers to take advantage of their summer vacations in this respect. Again it is conceded that such study need not necessarily be confined to a special subject, as stated in (a) above.

(In rating, items (b) and (c) may be combined and a total score given for both, or either item credited, as the case may be, and at the discretion of the observer.)

2. *Membership in organizations* is, to say the least, desirable and the score given to this item is in accordance with this sentiment. General opinion calls for membership in some association specifically devoted to the discussion of the special subject, and also in one of a more general professional nature. The oral discussions of vital topics and the interchanging of personal opinions and experiences, aside from the social contact, are desirable and usually inspire better effort on the part of the teacher in the future.

IV. Teaching Technique

The importance of this item is shown by the value given to its score. The term which is almost self-explanatory comprises that phase of teaching work which develops a method whereby the conditions for learning are arranged and controlled for the most efficient reactions and results. The sub-items define more specifically those phases which bear directly upon the problems of teaching.

A. CLEARNESS OF AIMS AND OBJECTIVES seems vital to success, and unless this is established in the beginning, the teacher's efforts will be dissipated in a great measure and result in just "shop work." This applies not only to the generalized work, extending over a period of time, but applies equally as well to the individual lesson. "What am I trying to accomplish, and how shall I go about it?" are questions which should be in the mind of the teacher when dealing with the subject taught.

B. PRESENTATION OF SUBJECT MATTER is treated under four heads.

1. *Organization* of teaching material is most important as bearing directly upon results obtained. With objectives established, teaching material must be organized to attain these objectives with the least waste. This means the proper evaluation of the material and arranging it in logical sequence—a sequence not necessarily from simple to complex, from known to unknown, but logical from the standpoint of best serving the needs of the situation and based upon sound psychology. Other things being equal, a rich experience background will lead to efficient organization as a rule. To the observer, the class material must be so disposed as to make the objectives of the recitation or class work obvious.

2. *Presentation* of subject matter in shops is somewhat different from that in an academic subject. Most teaching is objective and presentation of new material is quite so, in fact too much so in many instances. A clear, forceful presentation, which shows forethought and organization and which leaves its impress upon the class with evidence that it is being understood, should be the aim. Simply showing is not presentation, nor is an abstract dissertation desirable. A proper mean should be chosen.

3. *Discussion,* either in class presentation or in subsequent practice or drill periods, is not often found. The lack of it constitutes a major criticism of the special types of work. It is somewhat intimately related to thought stimulation (item c) but the latter is so important that it is given a separate place.

Discussions by the class, under the guidance of the teacher, are an important part of the teaching work. Considering them as recitations may clear the thought. This also makes them amenable to the same criteria applied to recitations in other subjects. Among the most important items are those of attitudes and reactions. We recognize more and more that the *attitudes* displayed and developed by students in their class work carry over in other situations and become a part of the student's life equipment. Again, the *reactions* exhibited by pupils toward their work are dependent in great measure upon whether their efforts, not only in the recitation period but in the shop work periods as well, are accompanied by satisfaction. There is no doubt that this factor influences and makes for an increased learning rate. These two examples alone show the importance of stressing an often neglected part of teaching manual arts subjects.

4. *Application* of principles taught to real situations so that the connection may be made between school and outside activities seems especially applicable in manual arts. The functional aspects are evident and can be made to meet the needs of students and, in a larger sense, those of the community.

C. THOUGHT STIMULATION, as has been stated, is of prime importance and may be stressed in a number of ways and in various instances. To stimulate thinking should be the aim of every teacher, and this objective lies at the root of all progress. It is only through the ability to think and to organize abstract and concrete materials that knowledge comes and progress is made.

1. The matter of *satisfaction* and *motivation* are correlated highly and the latter serves as a means to some of the desirable ends previously stated. *Unless the work is well motivated in a manner which serves ends recognized by the pupils as desirable, and not too far remote, we get little if any reactions from the pupils which are valid in forming proper habits or attitudes.* The choice of teaching material is so varied and extensive that no difficulty need be experienced in motivating the work.

2. The *project* or *problem* method lends itself admirably to the ends in view. It will stimulate the thinking process, lead to initiative, and result in satisfaction. Necessarily mere "projects" do not produce these results. The project method needs proper organization and must be adapted to the individual and the objectives in mind, if it is to produce proper results.

3. *Recitations* probably lend themselves best to thought stimulations. To know how much to tell and how much to leave to the pupil's initiative is a problem, and no definite rules can be formulated. Experienced teachers use various means. Special topics and discussions on a socialized basis are fruitful of good results. The extended use of job sheets with their question content are also valuable. Some textbook work is needed for best results.

As to the "question," it may be conceded that there are three places for this interrogation period. First, during the demonstration or specific direction period; second, after this period, for clarifying purposes; third, at the end of the problem or project, when the integration period is reached. This is simply a general statement and is modified as needs arise.

D. INTEGRATION. "The combination of different elements into a complex whole" is a definition given for the above term and is applicable generally to the process of education.

"The increasing diversity of industrial occupations and of living conditions tends constantly to increase the forces of differentiation, demanding increased forces of integration to balance and compensate."

The trend toward the "bloc" system of instruction and short "unit" courses has a definite tendency toward differentiation which is quite likely to leave the pupil "up in the air," with his lack of experience and background. It leaves him with little knowledge of the interrelations and interlocking of the various aspects of the manual work and their influence upon economic conditions in the world at large. It is the teacher's business to clarify the situation. This may be done in two ways.

1. The *summarizing* method has certain advantages as the integrating process may be brought about naturally and in the regular course of instruction. Such a period of bringing together the loose odds and ends of an extended study should be chosen as conditions warrant.

2. This bringing-together or *correlation* of various subjects bearing on the shop work gives a splendid opportunity for the tying-in process. Related subject matter is especially fruitful in the direction of integration. This phase of instruction in the manual arts work is receiving increased attention and extends over the field of economics, industrial relations, and social problems, as well as the more intimately related and technical subjects.

E. THE ATTITUDE TOWARDS INDIVIDUAL DIFFERENCES is most marked in the newer educational work. We have suddenly discovered that "there are children, individuals, who make up a group."

The psychology of individual differences has done much to change our viewpoint. Studies by Chambers,

Courtis, Van Denberg, and others have shown the very wide divergency of abilities among children and the "normal distribution" curve is now used frequently and judiciously, and intelligently applied by many.

Class exercises and drills should be used with discrimination. The projects are usually grouped as to principle, and the applications within the group are chosen to meet individual needs and abilities. When self-reliance has been established, the individual is the pivot about which the work centers, not the individuals about the work.

V. Shop Management

Contrary to general opinion, shop management has not been weighted excessively, being but 180 points out of 1000. Though it is important and bears to an extent upon the efficiency of teaching, yet it must not be made too prominent in discussion, because oftentimes purely mechanical ability, as exercised in shop procedure, may cover more vital deficiencies in teaching.

A. DISCIPLINE of the shop is somewhat different from that of the regular classroom due naturally to the character of the work. This discipline need not be of the restricted type, nor should it be entirely free and easy. A boy who is busy with his work, interested in it, and derives satisfaction therefrom does not need to be disciplined. It is the idle youngster who becomes a problem; sometimes a class problem arises if the work is improperly organized; illness is a fruitful source of disaffection. A co-operative type of discipline is desirable.

B. ATTENTION TO HYGIENIC CONDITIONS is important. Light, heat, and ventilation are factors which are neglected. As many shops are still in the basement, the above items need to be carefully checked. Temperatures from 65 to 68 degrees are ample; light should be from the left. Artificial lighting should be provided with properly shaded lamps. Ventilation is essential as the shops are nearly all rather dusty. Again, if the work necessitates much muscular effort, body odors are apt to be present and an influx of fresh air becomes a necessity.

C. ALERTNESS OF INSTRUCTOR (Shop procedure). This refers not only to the physical attitude of the teacher but to "subconscious" attention to what is going on about him He must be able to sense adverse conditions and unusual noises, while his physical attention is directed elsewhere. It is like driving an automobile—any unusual noise attracts our attention. Many teachers cannot divide their attention; they are likely to have disciplinary troubles and it will not be all smooth sailing.

D. CLASS ROUTINE is a term which is self-explanatory. In its best form it shows class work proceeding smoothly; noise is at a minimum and confusion is absent. No time is wasted in looking for materials and everything needed is on hand. There should be no waste of time in roll call; cleaning up should be accomplished expeditiously.

E. SHOP ORGANIZATION is treated under a number of sub-items which follow herewith.

1. *Orderliness.* The first impression of a work shop is often a lasting one, and if conditions are unsatisfactory in the beginning, it is a difficult matter to eradicate such an impression later. It goes without saying that order and care in the disposition of tools, supplies, lumber, and stains, are expected and a place for everything in its place is applicable.

2. *Cleanliness* is a prerequisite to efficient shop management. Clean windows, clean floors. Floors may be "clean" though shavings are being made. Clean walls, sink, equipment—all should present an appearance of care and up-keep.

3. *Condition of tools* is an item which has received the greatest weighting among the sub-items of shop organization. Nothing seems to be so intimately related to shop efficiency, or to be so positive an indicator of the teacher's mechanical ability as the condition and care of the shop tools.

a. The *general tools* should be properly stored either in racks, cupboards, or tool cribs; they are supposed to be arranged in an orderly manner, ready for instant use, kept clean, sharp, and in good repair.

b. The *bench tools* should similarly be in first-class condition. A glance should show every tool in its proper place. The manner in which the students keep their equipment is a reflection upon the teaching and the teacher's ideals. It is either good or bad.

4. The item, *shop machinery,* is of some importance as it affects not only the extent and type of work offered but carries with it the responsibility of safety to life and limb. Aside from these it is also an "indicator" as stated above.

a. *Arrangement.* The teacher is not always responsible for the layout of the machinery equipment. Often he finds the shop laid out completely. Yet, if conditions are bad regarding lighting of work, accessibility and efficient use of machinery, etc., then the score may well be lowered if no efforts have been made to rectify the errors.

b. *Upkeep.* In general, this refers to the proper care of machinery, cleanliness, proper oiling, care of belts and motors, and adjustments.

c. *Safety,* as applied to machinery, is of prime importance and as we are dealing with boys, it becomes necessary to provide all possible safeguards.

Saws and cylinders of jointers are to be especially protected; non-slipping floor mats must be provided at machines where stock is pushed into them; gears, belts, and pulleys must be guarded; high speed grinding wheels must be provided with ample steel guards. Motors mounted on machines are to be grounded. Glue pots must be mounted on non-combustible bases. It is of great help to post safety signs.

5. *Care of supplies.* As the materials used in the shops are of value and increase in price from year to year, it becomes necessary to pay considerable attention to their care, arrangement, and disposal if economic waste is to be prevented.

a. *Arrangement.* The supplies are to be accessible and arranged in an orderly manner. Stock racks for lumber, steel, wire, etc., should be provided and stock arranged logically. For the smaller supplies, bins and drawers, labeled and accessible, should be furnished. Paints, varnishes, and oils must be kept in fireproof vaults or storerooms if same are provided. Oily waste and rubbing cloths are to be kept in waste cans. Cleanliness is of course taken for granted.

b. *Records.* Inventory, cost and material accounting are forms of records which are met with infrequently but which are essential to good management. A cumulative inventory record, card index form, is convenient and may be kept up to date with little effort. Some form of record should also be kept of materials given out to students, whether this be either sold or distributed on a free basis. If the former, a cost accounting record must be kept.

6. *The use of industrial and material exhibits* is very desirable and in some cases is quite essential. Such exhibits are often sent out free and others may be obtained at a nominal sum. Screw and nail exhibits, hardware and cabinet trimmings, upholstery materials, and wood samples, may be collected by the teacher and properly mounted. However, such mounts placed on a wall, near the ceiling, are nearly all useless. They must be accessible and used when the occasion demands.

Many firms have movie films for free distribution. These depict in a most interesting manner manufacturing processes of various kinds. They make splendid objective teaching material.

Some Observations on How Young Europe Learns to Work

Agnes Lewis-Caviness

EVERY little while I learn something new about continental people and their manner of doing work that makes me wonder and admire. Sometimes I confess they exasperate me,—as for example, when I want one of them to try a shortcut method which I know will hurry us up and serve as well as the established rule; or when I want one to attempt a piece of work outside his regular line, being sure his ability to follow directions and his cleverness will carry us through. In neither case am I successful. Adamant is softer than they. "It is not so that I learned to do it," "It is impossible for me," "That is not my *metier* (trade)" are as near to acquiescence as I can get them. Sometimes I confess it is baffling, but there are compensations. When you want accuracy, neatness, and a nicely finished piece of work give them time, and you are satisfied. Of course there are some crooks and "four flushers" naturally, but they are so infrequent as to be negligible.

They have the apprentice system to thank for the habit of thoroughness. A man gives three years of his boyhood to learning a trade. At 14 years he finishes his obligatory schooling and his mother takes him to the proper official and says "I have come to secure the required papers for this lad to leave school." "Is it possible?" says the worthy gentleman, "I thought it was only day before yesterday that you entered him at 7 years. Still I suppose you must know. Yes, here it is—his birth certificate and here is the date he started to school. Very well, Madam, here you are. I hope he does well. Where do you mean to place him?" "At Zurich with a gardener." "Ah yes, that is very good;" or perhaps it is "At Strasbourg with a miller," or "Rolle with a bookbinder"—"Well that is fine. Now I wish him good fortune. Good day, Madam"—and that is over.

The parents sometimes have to pay his board and room while he learns, and later he is able to work for these. Later he may get a bit of pocket money but must have worked two years or even more.

There is a system, known as volunteers, which is interesting. A young person—just out of school—comes into your home to learn your particular language, and to work for his board and room and such spending money as you may give him. This arrangement usually lasts a year. Switzerland being a land of three languages offers much opportunity for this, and the peoples of French and German Switzerland often exchange children for a year's time. Now these volunteers come not only from the poor families, but from well-to-do families who send out their children in this fashion—being certain to look into the character of the family where they go. Many a rich man's daughter who would never learn housekeeping at home because of too many servants or too efficient mother and older sisters, learns it in another family,—blacking boots, making fires, doing the marketing—in a word, being a servant. This is what I like about them. So long as the girl is in the home she is a servant, and is treated as such, although both maid and mistress recognize that she comes from a fine home and will return to it when her "year" is finished. The mistress does not spoil her, nor does the maid think herself abused, because she is expected to keep her place as servant. To me it shows a very healthy mental attitude toward work.

In Scandinavia, a betrothed girl is expected to work one year in somebody's kitchen (her mother's won't answer) before marriage. The first summer I was in Switzerland I met a girl in such a position. I saw her first at morning church service on the Sabbath and wondered who the young woman was who wore—as I supposed, a wedding ring. The engagement ring in

Scandinavia is also a plain gold or silver band worn on the third finger. Her clothes, manner, and speech indicated good breeding. I heard her speaking to someone in good German, and a little later in meeting her she addressed me in careful, accurate English. She told me that being engaged to be married she must go out to service for a year. She had chosen to come that she might at the same time perfect her French. She had a place in the Sanitarium kitchen she told me. In the months that went by we grew to be quite friends. She had her French lessons three times a week but nine hours every day she peeled vegetables, washed floors, or dishes, set trays, and scrubbed tables or kettles—you know these people scrub everything about a kitchen—even the ceiling and the working stools. She used to get fearfully tired and in a little while her hands were terribly roughened and cracked from hard water and washing soda. I have seen them bleeding. It was months before she received a penny besides her "keep." I remember well when she received her first thirty francs. She was proud of her first thirty francs for it meant that she was succeeding. At the end of her year she went home, married her banker, and became mistress of a beautiful home.

This spring I saw a long, lean, good-looking fellow working with the gardener at the big gardens near our home. At first I thought he must be a friend of one of the men, visiting and giving a helping hand now and then. But the supposed visitor stayed on—always distinguishable because his clothes were neater and changed more frequently evidently, and he never forgot his cravat. He was a university graduate, who had specialized in scientific agriculture, and had a fine position waiting for him *as soon as* he had a year's practical experience. He was not a Swiss (he is a Swede) but was advised to take the work under a Swiss. He made friends among the guests at the Sanitarium and often in the evenings I saw him at tennis or croquet—the trimmest figure on the court; but all day he took orders from the little old chief gardener—who though a good man, I fear is not above taking a certain satisfaction in ordering about this student person. But the student person doesn't mind that—he only sets out young cabbages or ties up tomato plants hour after hour—and does it over again if he has not pleased his chief. He is completing his education.

A year ago last spring two Austrian girls came to take charge of the workers' kitchen and dining room. Everyone said the work was never so well done and that there never was such a nice spirit. One of the two was ambitious to learn English as well as French; so I sometimes had her down and read with her. She interested me so I have asked her many questions. "Did she and her friend know they were to do the cooking when they came?" for example. No, she says; there was some talk of it but they were not sure. Weren't they terrified then when they learned they must cook for thirty or forty people. No, not specially she answers. Oh, I went on inquisitively, you had training to prepare you for this. Well, she confessed, we tried to get ready for the possibility when we were in Frieda's home, but the cook was so severe she would not often let us into the kitchen and Frieda's mother would not permit us to annoy her."

Now I have it. Frieda's people keep a cook though she goes away to work! What else? I go on—"But at your own home, you perhaps did the cooking, did you not?"

"No, I always worked in an office. We kept two maids at home." (!)

"What was your object in leaving Austria?" "Well you see, during the war we had not been able to leave our country, and we had no opportunity to study languages at home and not money enough to travel, so we came to work here where we could learn French. *The sort of work we do is nothing since we have the chance at the language!*"

Most refreshing attitude to life and work!

There is a girl doing chamber work at this same hotel, who is longing for the day she is 18 so she can enter training as a nurse. She is large, strong, and well developed and looks 18 now. There is something so self-reliant about her that I was curious to know where she acquired her poise. Chambermaid in a pension in a foreign land—and enough dignity for a duchess or a hotel hostess! Once I got her to talking about herself. Her mother was a surgical nurse, hence the daughter's ambition. Her father had died when she was a baby and her mother had taken a house and found a nervous case who needed home surroundings as well as professional care. When the little girl was old enough to go to school the mother gave up her home case and went back to her place in the hospital, leaving home early in the morning and coming back in the evening. "What did you do all the while she was away, Marie?" I asked her. "My mother left me certain things to do. She combed my hair and saw I was dressed for school. We had our breakfast, then I washed the dishes and put the kitchen in order before I went to school. We both took our lunch. Since I was through first it was my business to go home, make the fire and have the house warm and the kettle boiling or the soup ready which Mother had prepared in the morning. Then I was to study."

"How old were you, Marie?"

"I was 7 when I began this. My mother left me three matches to make the fire. If one went out I had a second; if my second went out I had a third. But I couldn't let the third go out."

"Did the third one ever go out?" I asked her.

"Yes," she said. "Twice they all three went out, and I went to the neighbor's and asked her for more. Both times she came and helped me, but the second time she said, "Now, little girl, I have helped you twice; and I would not mind helping you often, but your mother does not mean me to and I cannot help you again. Your third match must not go out again."

"After that I had to get on myself."

"But, Marie," I asked her, "Didn't you ever go to play with other children instead of going home?"

"Yes, but I was punished when I did, and I didn't do it again."

"When I was 10 years old mother said to me, 'Now, my child, there are many kinds of clean, intelligent play, and I want you to learn as many as you can.' Then we began and evenings we played together. I learned to ride a bicycle, to swim, to row, to skate, to toboggan, to walk miles without tiring, and to play tennis and croquet. In bad weather we went to the museums and art galleries in our city—not just to look around, but to study with a catalog and learn what was there.

"When I had finished the required school, mother said I must learn languages. First she sent me to Holland—that was the nearest to my home. I worked in a family as general servant,—and I can read and speak Dutch rather well now. Then I went to Germany two years and did the same thing. Now I am here to learn French in the same way."

Now, these young people are not in danger of failing in their life's business. And they present something interesting for American educators to consider.

Black Letter Learning

Charles P. Coates, Los Angeles Schools

EVER so long ago, when life was more simple, Aristotle and his confréres of the slave-owning aristocracy of antiquity indoctrinated mankind with the perfidious notion that, inasmuch as no relationship existed between general intelligence and mechanical ability, any oaf might profitably receive instruction in the handicrafts. Like poison ivy this notion has trailed down through the centuries to the present time. Scratch anywhere beneath the mantle-rock and its runners are revealed taking hold in medieval folklore, in plans for the amelioration of benighted and savage pagans upon the shores of foreign lands, in interspective psychology, and even in the "Cultural Essays" of Katherine Gerould. Only yesterday, Prof. W. D. Commins, a notable student of mental variations, reaffirmed Aristotle's major premise, that no relationship exists between general intelligence and mechanical ability, and declared that those who are both intelligent and mechanically gifted do not as a rule get to college. "Education," he surreptitiously interposes, "is a selective process, and the less intelligent drop by the wayside."[1]

Of course the significant point is that such reasoning and the consequent "wayside" defections quite clearly foreshadow the unhappy destiny of worth-while handicraft instruction in our public schools. Or is it that manual education has not been well "sold" to our fellow educators?

We may suspect some consequence yet hanging in abeyance
Shall bitterly begin his fearful date
With this day's indolence.

Now a certain group of pseudo-psychologists would have us believe that the sense of inferiority is more acute in some students than we imagine, and that consequently it subordinates them to the dominion of other minds. Gradually, they contend, the weaker lose their sense of capacity to externalize self in any effective way, and hence they accept a social position of continuous and persistent inferiority. Likewise, repression and rivalry yield an unearned increment: "the stronger grow to glory, not in their own strength, but in the fact that they are stronger." Manual education, they fancy, is the panacea for this evil; for it "lends itself easily, and almost as a matter of course, to the development of social habits."

Unfortunately the problem of the inferior student is an ever present one. But do these pseudo-psychologists think the inferior students can best be eliminated by making them stronger? Can we forestall the hand of Mother Nature? Is it demonstrated that rivalry does not stimulate progress? Is it demonstrated that rivalry is not present in manual education courses? Within a brief period of time the assumption that an inferior student profits best by handicraft instruction would make the manual education department a dumping ground for morons.

Other more telling illustrations of quotidian vagaries pivoted upon the Aristotelian fallacy might be selected from another field of education; namely, that of public school administration. But I stop only to point out one which concerns the subject of manual education most closely. Rightly enough, those in educational administrative positions believe there should be a place for every boy in the school. For some time, moreover, it has been the custom to go to high school and a disgrace not to go. Strange, is it not, that when the intelligence-quotient of a matriculant is low some administrators assume at once that his "place" is in the manual education department?

Is this the psychology that sustained Woodward and Runkle and Griffith, and other handicraftsmen whose names are blazed in seasoned oak along the bewildering, arduous trail? Ah, full well we know that it is not. Awake, outstanding leaders! Do you not hear the bold challenge? Bogus educational doctrine and research are abroad in the land! Alas, where now are such leaders as the "Fathers of Manual Training" to address themselves with ruthless directness to refuting the devotees of black letter learning? Where now is there a John D. Runkle to present a program, to outline what manual education can be made to mean, and to show for whom handicraft instruction is intended? Where now is there a Calvin Woodward to point out with untiring persistence the high correlation between

[1] "The Mechanical Ability of College Students," **School and Society**; 23:490, April, 1926. Clearly enough, Professor Cummins' conclusions are based upon inadequate data secured to support preconceived ideas of an intellectual aristocracy.

pupils' grades in academic subjects and their grades in manual education subjects?[2]

Whenever my thoughts drift back to far-off days, I am likely to forget that perhaps a few older readers of the INDUSTRIAL-ARTS MAGAZINE have vivid memories of the time when Calvin Woodward overturned the traditional ideas of handicraft instruction. Yet, many others do not now remember him, with towering frame, restless hands, and deep-set eyes that glowed with a unique light, like the light on the earth when the sun passes into the shadow-bands of the moon. Quite often his teeming brain and excess of earnestness made him overshoot the mark; but despite his detractors' taunts, he remained sanguine, tireless, and undismayed.

[2]It is interesting to recall that the archives of Washington University show a very high correlation for some 1300 graduates from Woodward's **Pioneer Manual Training High School.** This high correlation would be meaningless in refutation of Professor Cummins' findings from 91 college students save for the fact that more than 20 per cent of the 1300 received degrees from higher institutions.

Younger teachers, you know well enough that you belong to an ungrateful generation that is quick in its hard indictment of the prophetic progressives of today who will be the pathetic conservatives of tomorrow. During these transitional days when many interweaving factors are at work to spread the gangrene of dissatisfaction and disharmony of opinion among your leaders, let no dioriented sciolist—who thinks he has chanced on the spoor of something worth while in education—convince you that the "Fathers of '76" were old fogies. Always remember that their democratic theories found verification in practice. Their theories, too, withstood the hardest test of all: application to the conditions of the actual schoolroom. With knowledge of what they spoke about, they met their academic opponents upon the "level" and parted from them upon the "square."

False Alarms

Laurence Parker, Kansas State Teachers' College, Pittsburg, Kans.

The old black cat, we later learned to call "Old False Alarm," came to our house hungry and homeless one day about dusk. Mrs. Parker cannot turn a cat away hungry, so it was fed. It was the kind of cat that once fed continues to board with you until *something happens.*

After ten days' residence with us the alarm "mouse in the kitchen" was sounded and the old cat was shut up there "to operate." There was something so professional about the way it hunted clues that it was left alone to complete the job. There was something so convincing about its actions that we would have cheerfully filled out a death certificate for the mouse if it had been required.

Next day in cleaning pantry shelves, Mrs. Parker discovered a mouse peering out at her. He was a deaf mouse probably, for he never stirred while she summoned the old cat.

It was reassuring to see the professional manner of that cat as it entered the pantry and took in the situation. The mouse, though, sat perfectly still and let the cat look him over. The cat took a long look, and then turned about and sauntered out. It was then the mouse departed, much the smarter of the two animals.

Why? Why did the cat fail to recognize the mouse and pounce? No one will ever know for sure, but here is our solution. The old cat knew the theory of mouse catching. Its mother or some other instructor had given it all the theory and so coached it that it had the business-like manner of a first-class hunter. There had never been a convenient time to let it practice on a real live mouse. Without doubt all the pictures in the textbook showed a mouse in side view and scampering. Here was a front view of a motionless animal which would scarcely be recognized by a *theoretical* mouse catcher. It had the professional manner of a mouser, but for real results it was a false alarm.

Dr. Prosser has told us of another false alarm, the product of trade schools of long ago. This man was one of a large class who were trained to be blacksmiths.

There were not horses enough for the necessary practice in horseshoeing. As so often happens in such emergencies, a substitute "exercise" was resorted to. Carved wooden horses' legs were clamped in the vise at the bench, and the shoes fitted to them and nailed into place. These men graduated as general blacksmiths and went out into the world.

Later, the school wrote a follow-up inquiry to its alumni asking as to the results of training. A blacksmith wrote in from a western state as follows: "I can do the iron work first class, but I can't get the darned horses to let me clamp their darned legs in the vise so I can shoe them."

These are just stories, you will say, so here is another "false alarm" which I know to be a real one. A mother asked a plumber in a Kansas town to take her son on as a journeyman "for he had learned all about plumbing" in a commercial trade school.

The plumber gave the boy an examination by throwing two old pieces of lead pipe into a box and telling him to wipe a joint upon them. The boy, nothing daunted, reached for the pipe and was told to leave them where they were. "But I learned to wipe joints on a bench," he said. "If I can only get them out of the box I'll do a first class job." "Son," said the plumber, "when I send you out on a job you must be able to wipe joints at the bottom of a barrel."

The moral to these anecdotes should be plain. The nearer the practice work of our students comes to actual working conditions in life the less chance we have of turning out "false alarms." This is not always easy to do, but is worth all the planning and contriving of a smart instructor.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

SCHOOL THE ONLY ROAD TO EDUCATION AND SUCCESS

In our natural and commendable anxiety for universal education, we have often confused education with going to school. It has all too often been assumed that simply to be in school and to remain in school is always beneficial and definitely educational. On the other hand, it has been too commonly thought that work of any sort had no educational value.

Both of these extreme views, like most extreme views, are far from the truth. Many of the colleges and universities have large numbers of young men and young women who would be better off if they had to get into the work of the world and learn to do something worth while that would keep them from living the parasitic life. So also is it true that there are multitudes of young men and women in commercial, industrial, and trade pursuits, who in common justice, ought to have a chance at more education from the standpoints of the school. In each case, the schools would be improved, the young people involved would be greatly benefitted, and the work of the commercial, industrial, and trade pursuits would certainly not suffer.

Besides these considerations, there is another phase of the common misunderstanding mentioned at the outset. That is the fact that much of the work of the world is decidedly educative. Witness the multitudes of prosperous and highly efficient men and women in commerce, industry, and the trades who found their way to prosperity and efficiency not through the schools but through the avenue of the daily grind in some worth while occupations. We suspect that inherited tendencies and characteristics play a much larger part in their success and in the success of those who go through schools than people are generally willing to admit.

It is therefore not always a matter of certain disaster when a young man strikes out from high school into a chosen occupation. It depends a good deal upon what kind of stuff he is made of. He may be the very type for whom the school would do no good. Until our schools function more surely in the work of the world, it will not be certain that their curriculums will inevitably insure success.

SELLING ART EDUCATION

One criticism of art instruction in the schools by T. M. Dillaway, Director of Art Education in the schools of Philadelphia, is that "Too much attention is given to making something sensational in order to sell the idea of the value of art education."

School exhibitions have improved of late years in this regard.

In times past it was customary to exhibit the work of a very few exceptional pupils and so misrepresent the work of the school by showing work above average in execution and hardly consistent as part of a well planned course. We have seen the particular abominations referred to by Mr. Dillaway. Posters that were ambitious beyond the ability of school children showing direct imitation of well-known posters made by artists; discarded tin cans and paper boxes ornamented with superfluous patterns; paper torn and cut ornaments that were the result of dictation and could have no educational value in a thoughtless process of doing things blindly; complete sets of furniture made by exceptional students who must have neglected other work to do a show piece. We have seen these, and many more, examples of exhibition work and have noted the surprise and admiration of parents, and even school officials, when they discover that such work can be done by children. Pretentious exhibitions have made temporary enthusiasts for art education but when it is discovered that the teacher is more concerned with the exhibition than with the educational value of the subject, the reaction is likely to disparage the teacher and the subject.

Most thoughtful people believe that conceptions of beauty and standards of excellence in the arts should be given to all children as part of their school work and study, but few thoughtful people are convinced that a way of doing this has been devised and practiced.

Our art teaching is not convincing. The meaning of art has not been generally impressed. Our teachers have been trained on the technical side so exclusively that they lack general cultural background.

We believe progress has been made, however, and that greater improvement is to come rapidly. American life is putting greater value on art than heretofore. The commodities of life are designed with a taste and sobriety that is in definite contrast with the fantastic forms of past years. Even rural communities are brought into direct contact with the arts through modern facilities.

The great problem in art education is still to find a convincing method of instruction and to train teachers who are capable of using it.

THE INDUSTRIAL ARTS A TRAINING SCHOOL

Scarcely a day passes that someone does not mention an instance of some industrial arts teacher's employment in some apparently unrelated field of work. Remarks are made with surprise on such occurrences and with some intimation as to the accidental nature of such transfers. One man leaves the industrial arts field and takes an important supervisory position in life insurance. Another man jumps into leadership in the national chamber of commerce. Others go into newspaper and publicity fields. Still others become editors. Some go into educational positions apparently wholly unrelated to the field of the industrial arts. Others go on the lecture platform. Others enter manufacturing.

When one considers the variety of training, the complicated experiences, and the large and varied responsibilities that have been expected of the industrial arts teacher, one need not be surprised at the varied demands for his services. The industrial arts teacher must have at least two distinct phases of education. He must be something of a psychologist. He must be able to make budgets, to meet the public, to put his case before the executives, to fight his own battles, to sell his propositions with a superior type of salesmanship, to go into the markets and buy a great variety of materials and supplies, to design buildings and supervise their construction, to supervise other teachers and workmen, to make out and submit an intelligent and convincing report of his work, to do all this and more at a minimum of cost, and to do a million and other things that other teachers are never supposed to do or be able to do.

Is it any wonder that a man with such experience and training, if he lives, can sell life insurance, write for newspapers, run a girls' school, dig trenches, make jewelry, sell automobiles, lecture, manage stores, supervise tradesmen, paint pictures, build roads, and do almost anything else he may be called upon to do?

The industrial arts field offers one of the greatest opportunities in the world for broad, general preparation for real services in a great variety of fields. When such a teacher is imposed upon, as he frequently is, by all other departments of the school system, when he has to work longer hours at more strenuous tasks, when he is called upon a score of times by the city and the various organizations in the city to do what others cannot do, when he is looked upon as the natural leader of the boys of the community, and when he finds himself contributing in a great variety of ways to the welfare of the school system and the community, let him thank his lucky stars that he has chosen this marvelously versatile and effective training school of the industrial arts.

OUR FLAG AS A DESIGN

The Stars and Stripes has impressed us in a vague way as an adequate idea adequately expressed but few Americans have conceived it in the light of a complete and perfected design.

Just why does it fulfill the requirements of a most inspiring symbol of these United States?

A horizontal rectangle of flexible material, held to the wind by a vertical staff attached to the narrow side, and so adapted to perform under the action of gravity and the wind in diagonal rolls or folds.

Stars of white purity and idealism representing the states in a square of blue fidelity and unity placed at the upper corner of the rectangle against the staff, which is the only part of the rectangle that is comparatively quiet and fixed for the display of the stars when the flag is in action.

Horizontal stripes of red valor, ardent love, impelling energy in a field of white purity and idealism, so adapted to the diagonal folds of the flag in action that the rhythm is accentuated by the contrasted lines of red and white.

Such analysis of the flag adds nothing to the impression of our splendid national symbol as we see it furling and unfurling in active expression of our ideals. Understanding the composition of a device will give us little added appreciation, but as designers and teachers of design, we should interpret effective design in terms of cause and effect. We should attempt to find out why any instrument serves its purpose and so prepare ourselves to think through a project from the first conception of purpose to the completed design.

No better example may be found in our country than our flag.

It is but natural, therefore, that the public looks to the schools to offer the pupils some opportunities in art education, either from the viewpoint of the user of art products, or of the producer of art objects. Doubtless the contribution that art education in the public schools can make to the largest number is to develop the desire and capacity to enjoy beautiful things, and to cultivate an appreciation of and a discriminating taste in the matters of form, design, and color which enter into their daily living.—*A. B. Meredith, Commissioner of Education, Connecticut.*

THE LOWLY CARPENTER

And good came out of Nazareth!
Behold and it was a lowly carpenter
Who worked in wood!
Who knows, how at his rude bench,
As the materialistic thing in wood he wrought,
He dreamed and pondered
The things sublime that astounded the teachers
In the temple, and became
The Rock of Ages—to which man
Of every race and clime has clung
For succor!
Ye workers in wood and those who teach,
A challenge comes this Yuletide—
A challenge and a hope!
A challenge to strive on with untiring vigor;
For as good did come out of obscure Nazareth,
Out of a humble carpenter shop,
So likewise, can good undreamed of
Come from out the lowliest places
Even to-day.
A hope that the toil of your hands
The working of your mind and heart
May find lodgment
In the soul of a youth
At his bench!
Even as Joseph of old
Wrought, taught, and achieved for the ages,
Though perhaps unknowing.
Your success is not measured
In material things of wood,
But in the development of the soul
Of the youth at his bench.
Let this Holy Christmas
Renew your courage and your faith
In your task and in the
Youth of our land!

—A. E. Gray.

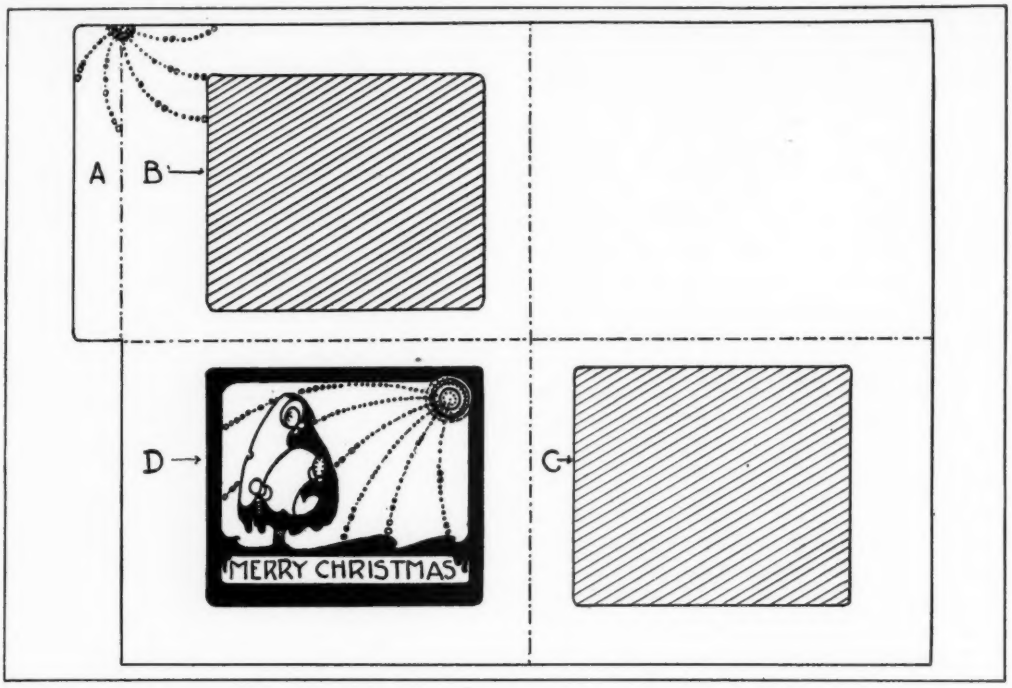


FIGURE 1. (THE PAPER, INCLUDING FLAP A, MEASURES 10½" LONG BY 7¾" HIGH.)

Christmas Cards

Margaret Fullerton

With the approach of Christmas comes the thought of absent friends and the custom of sending cards expressing our wishes that theirs may be a merry one, and that the succeeding year may be happy and prosperous.

This practice will undoubtedly survive until a better solution to the problem of remembering distant loved ones is devised. And yet what happier way of sending our holiday messages could be wished for?

Fifty years ago a Christmas card was a novelty, and twice that long ago saw the beginnings of what may legitimately be called the greeting card. This was in the "school pieces" sometimes offered as a reward of merit at holiday school programs. These cards were made elaborate with pen flourishes which formed birds, scrolls, and flowers. Sometimes they were headed with copperplate engravings, either plain or colored.

About the middle of the nineteenth century the London Times commented upon a progressive English publisher who issued and sold nearly a thousand copies of a holiday card. "The first Christmas card ever published," it reports, "was issued in 1846 at the office of Felix Summerly's Home Treasury. The drawing was by J. C. Harsley, R.A. It was printed in lithography by Mr. Jobbins of Warwick Court, and colored by hand."

This same period brought forth several cards by American publishers, one firm having such faith in the venture that they placed four different designs on the market at one time and sold several hundred copies of each pattern. While the demand for these printed cards, with their designs of holly branches, robins, and Biblical scenes grew among those who could afford them, the majority of people wrote out their own personal messages. Because these cards were written by hand, generally illustrated and colored by hand, they could not help but carry with them the feeling that they were a personal gift from the sender.

Each year when the holidays are past and the cards which have accumulated are stacked together, a few can be picked out which are more interesting than all the others.

Among the collection last year was one from a busy New York business man who each year writes his own cheery Christmas jingle, has it printed on a plain card, and mounts about it his latest kodak picture taken with his holiday smile. It fairly radiates his personal hearty good wishes.

Another which was worthy of note was sent by a couple who had just moved into their cottage by a lake. Their cards were wood-blocked from a bold little sketch of their home with waves at the bottom of the card, a pine tree in the background, and a Christmas taper spotted with the addition of a fleck of red paint, burning in the window.

From a family with several children who wished to send their good wishes all together, came a card decorated with a crude but lively picture of all the family, even the favorite pup, all done in straight line figures.

How much more satisfactory were these than was the card received from Michigan which exactly matched the card sent from Wyoming, even to the ten-cent price mark left on the back!

Either as a class problem, or to satisfy the individual's quest for a card which is truly expressive of his own personal wishes, there is a great field of possibilities in the line of blue printing, Van Dyke printing, and printing upon photographic developing paper. The cost is negligible; the results are dependable.

The first consideration in attempting this project is choosing a motif symbolical not only of the Christmas

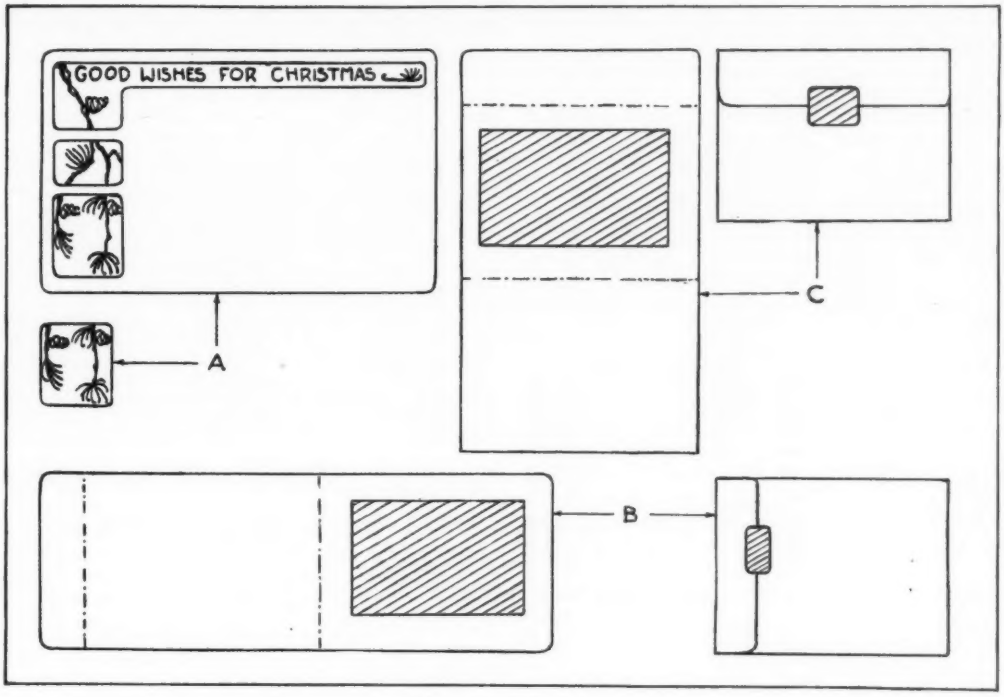


FIGURE 2.

spirit, but also of the spirit of the community or the individual from whom it comes.

Religious and legendary symbols predominate in holiday designs. The star, the Wise Men, the Madonna and Child are always favorite subjects. The Yule log, the Christmas feast, and the candles to guide the traveler, are often treated. Legends from different countries have given us Santa Claus and the reindeer, mistletoe, holly, and the lighted tree as designs.

Not forgetting the field offered by these motifs in making patterns, we should also be mindful of the great store of designs which radiate the spirit of some special locality or some particular family or individual at holiday time. Christmas comes alike to communities which are snowbound and those which are flooded with sunshine, and there is no rule to confine us in expressing our good wishes with pictures of any one clime. In the south the holidays bring palms and cactus, sagebrush and sunshine. Holly and mistletoe may be absent at the seashore, and yet the holiday spirit still revels amid its surroundings of cliffs, lighthouses, salt pines and sea shells. In the north the Christmas stars shine down on snow-covered mountains, evergreen forests, and bright berries which give endless choices for artistic expression. We may add more personal motifs and use for our pattern a silhouette of our horizon or of the yard and house, snapshots of members of the family, or an illustrated verse written in script.

Once one is familiar with the processes used in printing the cards, working out the design in proper form is comparatively easy. Directions for using blue print paper, Van Dyke paper, and photographic developing papers are given in the paragraphs which follow.

1. *Blue Prints from Tracings.* Blue print paper is carried in rolls wherever supplies for architects or engineers are handled, or in sheets or post cards by photo supply houses. The design is worked out in black and white on drawing paper. This is traced in India ink onto tracing paper or tracing cloth. The inked side of the negative is placed next to the glass in a printing frame such as is used in printing ordinary blue prints or kodak pictures, covered with a piece of blue print paper, and exposed to the sunlight. The time, varying from a few seconds to several minutes, is governed by the strength of the light. When sufficiently exposed, the blue print paper is removed, washed in clean water, and dried. The parts which were not protected from the light will be dark blue; the areas covered by black spots and lines will be white. Thus the print will be just the opposite of the tracing in its arrangement of light and dark.

2. *Van Dyke Prints.* Van Dyke paper, together with directions for using it, and salts for fixing the prints, is supplied by dealers in engineers' materials. It may be used to produce prints having either a brown background with white lines, or a white background with brown lines.

To make prints having white lines upon a brown background proceed exactly as in making blue prints, using the tracing as a negative. This is known as a Van Dyke *positive* print.

Designs having brown lines upon a white background, and known as Van Dyke *negative* prints, can be made by substituting a Van Dyke positive for the tracing, and then printing upon Van Dyke paper in the usual manner. The arrangement of light and shade will thus be the same as they were in the original tracing.

3. *Blue Prints from Van Dyke Positives.* Blue print paper or post cards can be used to produce blue line designs upon a white background by first making a Van Dyke positive from the tracing, and then making a blue print from this.

4. *Printing upon Photographic Developing Papers.* Velox, Azo, and similar photographic developing papers can be manipulated to produce interesting and artistic holiday cards and folders in almost countless variety. The wide range in surface textures, weights, and tints in which these papers are available makes it possible to obtain almost any effect desired.

Among the processes suitable for this purpose, the following are especially worthy of experimentation:

(a) Printing from Van Dyke positives upon various grades of mat, semi-mat, and smooth Velox.

(b) Producing sepia colored effects by redeveloping Velox prints.

(c) Using Velox "Kodak Velvet Green" papers, which produce prints of a pleasing, soft green shade.

Cut paper patterns are well adapted for printing by these methods because the silhouettes appear so sharp and clear. For this reason it will be found simpler when treating areas such as "B" and "C" in Figure One, to cover them with a piece of dark paper carefully pasted in place on the tracing paper, rather than inking them in. Most fascinating designs may be worked out by mounting ferns, flowers, sprays of evergreen needles or holly, on tracing paper or pressing them between two pieces of glass, confining them within cut paper borders, and printing their silhouettes. It is also possible to make interesting all over patterns for backgrounds by choosing bits of beautiful net or lace and using them in this manner. Those who wish to produce the crackled background characteristic of batik work will obtain satisfactory results by crushing the tracing paper into a hard ball, then smoothing it out flat so that the creases will show like shadows.

A majority of the Christmas cards must be mailed and there arises the problem of finding envelopes which harmonize in texture with the different printing papers. Some may choose to trace the outline of an envelope on tracing paper, blocking in the space for the address or writing it in on the tracing paper, and thus print envelopes which need only to be cut and folded. Figure One shows a method of printing the design in a folder with spaces for greetings and for the address. This makes a card which requires no other envelope. It is sealed by gluing down the flap "A". When using small sized cards or small sheets of printing paper, it is practical to print only the design. The design is mounted on a folder made from paper which harmonizes in texture and color with the printed portion. Suitable papers may be found in art shops, although the ingenious craftsman will probably utilize pieces of wall paper, backs of bulletins, samples of stationery, and other similar materials. "B" and "C" in Figure Two suggest two patterns for cutting such folders. In each case the flap is sealed with a sticker designed to match the main design, and printed at the same time with it. "A" in Figure Two shows a sticker for this purpose.

In the same manner in which cards are made, it is possible to produce seals, stickers, or wrappers for special boxes. Colored with addition of bright spots of paint and gilt, they not only spread the spirit of Christmas, but they seem to carry with each one the personality of the one who designed, printed, and sent them.

SHOP TEACHER'S CALENDAR

Tasks for December Shop Management—Teacher should give some thought to the mid-year examinations and to the amount of work to be covered. Make plans for the holiday season recreation, Christmas entertainment, and projects for Christmas. Toys already under construction should be finished; old toys should be brought to the school shop for repair and refinishing.

Instruction—The teacher should cooperate with industry with the idea of increasing evening school attendance. Make plans for new courses, check up work to see that the skill is up to the standard, test the amount of related information given the students.

Problems—Prepare material for projects involving the Christmas idea, such as tree stands, decorations, and toys. Emphasize safety first in trees and decorations.

Community Service—Cooperate with local agencies in the making of toys and other articles for the needy and in providing Christmas baskets to be filled by the pupils of the school.

Mr. Frank Cushman of the Federal Board for Vocational Education, has been granted a leave of absence for the school year 1926-1927 for the purpose of working in Los Angeles, Calif., in cooperation with Mr. Kienholz, in the development of a plan of local supervision for the benefit of employed teachers in service.

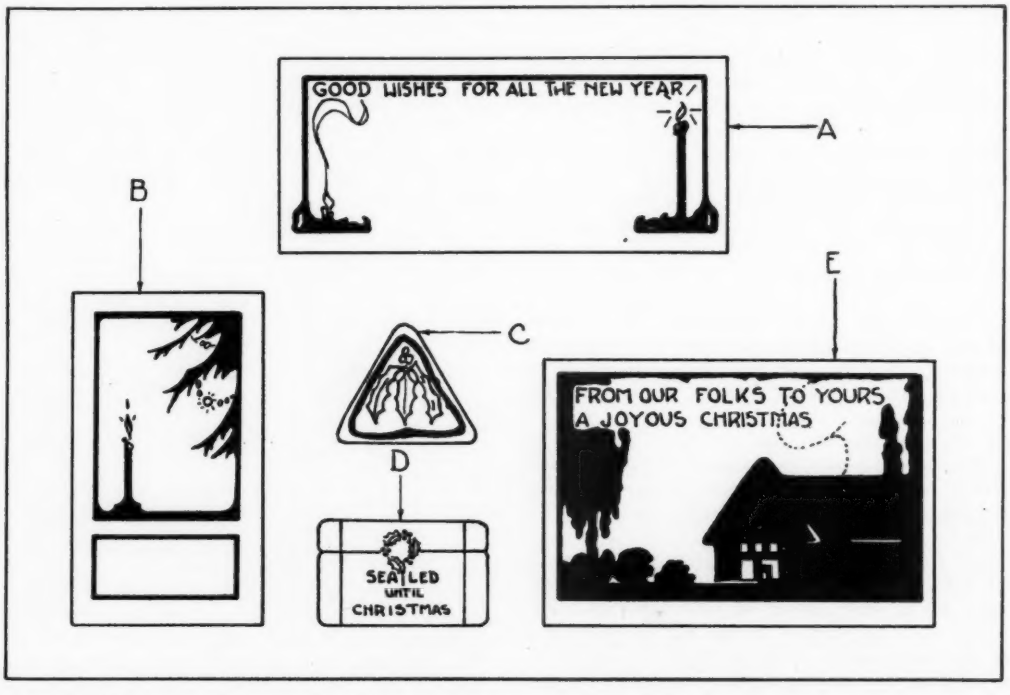
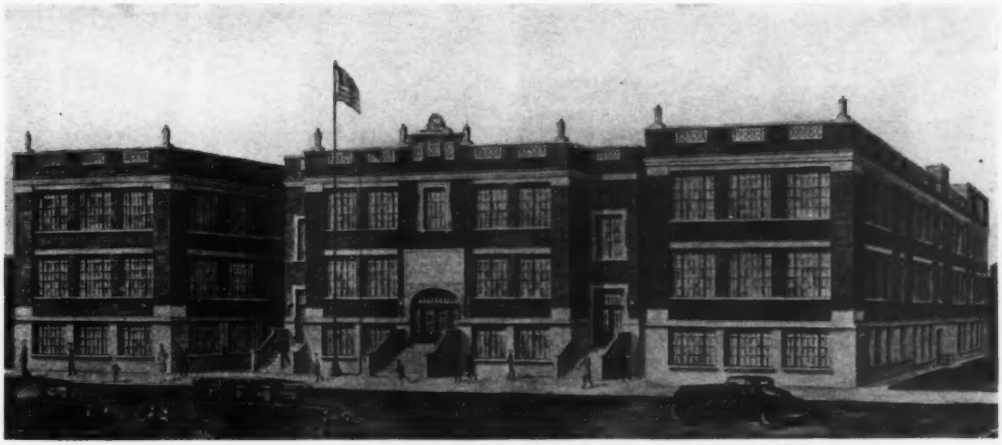


FIGURE 3. THE DIMENSIONS OF THE ILLUSTRATIONS ARE JUST ONE-HALF OF THE ORIGINAL CARDS.



THEODORE AHRENS TRADE SCHOOL, LOUISVILLE, KY., WHICH WILL BE OPENED WHEN THE CONVENTION MEETS.

The South and the Louisville Convention

December 2-3-4

Leonard W. Wahlstrom, Chicago, Ill.

That the approaching convention of the American Vocational Association at Louisville, Kentucky, will be one of the biggest and most far-reaching gatherings devoted to vocational education for many years is already an assured fact. There are several reasons why this is so.

First, there never was a time when all interests devoted to vocational education were so united to further the big aims for which vocational education stands. Sectional interests and feelings have been submerged and a feeling of unity embracing the entire country is apparent.

Second, this meeting comes at the end of the first decade of activity under the Smith-Hughes act. Many will recall the enthusiasm with which the word was received on February 23, 1917, at the meeting of the National Society in Indianapolis, that President Wilson had signed the bill which gave federal aid to vocational education and established the Federal Board for Vocational Education. Many will also recall the words of caution which Dr. C. A. Prosser uttered at that time, that the work had hardly begun and that renewed efforts were necessary to justify the faith of the President and the Congress in our ability to handle this big problem. These ten years have been years of struggle and effort to live up to this faith and establish vocational education on a basis which would be a credit to our nation. They have been years of experiment, years of trial and error. But, we can point to many such experiments which have been proved and are now firmly established in our educational life—continuation schools, part-time classes, apprentice training, training of foremen—space will not permit mentioning all. We can not, however, sit back with a satisfied air at this time and feel that we have reached our goal. This is the time to "take account of stock" and make bigger plans for the future.

Third, this convention comes to Louisville at a time when the entire South is intensely interested in all forms of education and particularly in vocational education of every sort, agricultural, commercial, home economics, rehabilitation and industrial. Kentucky is becoming famous more for its mooplight schools than for its "moonshine"; Georgia and Alabama still have "cotton field niggers," but have also trained some mighty good automechanics. Muscle Shoals is putting a new kind of energy into the South. The schools are keenly alive to all that this means in the way of industrial education. The industrial revival of the South has already arrived. And the schools are "arriving" with courses to meet the needs so rapidly that all the machinery involved in properly administering this form of education from J. C. Wright, director of the Federal Board of Vocational Education, and his various assistants, through the state directors down to local supervisors and teachers, are kept more than busy. Visitors to the convention coming from the East, the West, and North will have much to learn from the leaders of vocational education in the South.

Tuskegee, Hampton, and Berea stand for the best in vocational education and are pioneers in this field. They have a long and worthy history. In every state in the South, however, there are rapidly developing, splendid schools of every type. These are both public and private.

We are indebted to J. M. Hall, federal agent for industrial education, for the excellent photographs and the following facts concerning the vocational work in the various Southern states.

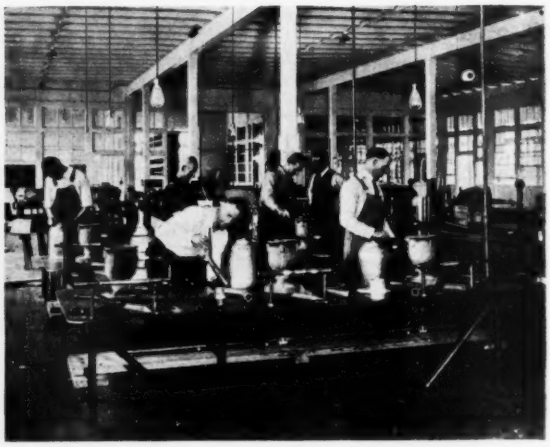
Of particular interest at this time is the new Theodore Ahrens Trade School at Louisville, which is illustrated in the accompanying photograph. This school will be occupied at the time of the convention and will no doubt be an objective point for everyone attending the convention.

Throughout the South much attention has been paid to organizing classes for employed workers. It is believed of vital importance to increase the efficiency of this group before attempting to develop on a large scale, courses for boys and girls still in school who will later enter the various occupations.

This power has led to a rapid growth of evening schools and part-time trade classes. These courses in all of the Southern states cover a wide range of occupations but in the main the predominant industries in the state or section have been given greater consideration.

In North Carolina, South Carolina, and Georgia, naturally training in the textile industries predominates. These classes cover such subjects as loom fixing, weaving, cloth analysis, textile calculations, etc. The mills or the welfare center of the village are usually used for these classes. Instructors for this work are recruited from the mills themselves and are trained for the work by

PART TIME TRAINING OF MARBLE SETTERS AT THE UNIVERSITY OF TENNESSEE, KNOXVILLE, TENN.



PLUMBING CLASS AT THE ISAAC DELGADO CENTRAL TRADE SCHOOL, NEW ORLEANS, LA.

itinerant teacher trainers and sometimes by intensive courses at some training institution. At Greenville, S. Car., the most extensive program of this sort has been developed. Here classes are in operation for about six months during the year. About 25 or 30 evening textile classes are included in this program besides trade preparatory classes in textiles, machine shop and woodworking in the Parker District High School.

In cooperating with the various industries there have been developed some noteworthy examples of apprentice training throughout the South. Among these might be mentioned the classes for machinist apprentices at the shipyards at Newport News, Va. The National Marble Dealers' Association are cooperating with a class for marble setters' apprentices at the University of Tennessee. In the steel plants of Birmingham, Alabama, classes for machinist apprentices are being conducted. The Illinois Central Railroad shops at McComb, Miss., have classes for machinists' apprentices and likewise the Chicago, Rock Island, and Pacific at Little Rock, Ark., and the Missouri Pacific at Chickasha and Shawnee, Okla. At El Paso and San Antonio, Texas, apprentice classes in auto mechanics and carpentry have been established. Memphis, Tenn., has classes for plumbers and bricklayers' apprentices. So also has Nashville.

Training classes for probationary nurses is another feature of the vocational work which has been developed to a considerable extent throughout the South. This form of training has been developed particularly in Texas and Virginia. This work is carried on through the state department with the public schools in one of the larger cities. Norfolk, Va., and Austin, Dallas, El Paso, Fort Worth, Houston, and San Antonio, Texas, are the most important centers where this work has been carried on.

Training of foremen through foremanship conferences has been particularly successful throughout the South. In the state of Virginia alone over 261 foremen received training through these conferences. Oklahoma, Missouri, and Kansas have cooperated with the Tri-State Lead and Zinc Ore Producers Association in conducting foreman training classes. This has resulted in training over 100 foremen for this industry. In Alabama the steel and iron industries of Birmingham and the various cotton mills have cooperated in foremanship classes. An annual conference for foremen and superintendents of cotton mills is conducted at the University of Alabama at Tuscaloosa.

One of the outstanding raw products of the South is lumber. The states of Arkansas, Tennessee, and Mississippi are heavy producers, particularly of hard woods. Courses in kiln drying of lumber have been very successful and have resulted in reducing much waste in this product. Experts from the Forest Products Laboratory at Madison, Wisconsin, have been employed in this work. These courses have been conducted in Pine Bluff and Crosett, Ark., Memphis, Tenn., and Hattiesburg, Miss.

Vocational education throughout various sections has benefited by the benefactions of public spirited citizens. In some cases these aids have been directly to the public school system and again they have resulted in privately endowed schools. In either event they have resulted in excellent institutions which have been an inspiration to their own and surrounding communities. Their courses have been directed and guided by the Federal Board for Vocational Education to a large extent. Space will permit mention of but two or three such schools which will serve to illustrate the type.

The Theodore Ahrens Trade School at Louisville, Ky., has well developed trade courses, continuation classes, evening school and part-time classes. These include salesmanship, sheet metal, printing, cabinet making, machine shop, office practice, and bookbinding.

New Orleans has the Delgado Trade School, endowed by the late Isaac Delgado, a merchant. The city of New Orleans and the state of Louisiana maintain the school through joint appropriations. Day-trade, part-time, and evening school classes are conducted. These include drafting, cabinet making, carpentry, electricity, fresco painting, machine shop, pattern making, plumbing, printing, sheet metal work, sign painting, stewardship, and tailoring. The total enrollment for 1925-26 was 448 in the day trade classes and 1,050 in the evening classes. The part-time classes enrolled 56 students.

The Francis T. Nicholls Industrial School for Girls is a part of the public school system of New Orleans. Courses include dressmaking, millinery, commercial art, costume design and commercial cookery. Three hundred and forty-eight pupils were enrolled in the day classes, 160 in the part-time, and 88 in the evening classes.

Charleston, S. Car., is proud of the Murray Vocational School, a gift of Andrew B. Murray, a citizen of Charleston. Courses in auto mechanics, electricity, woodworking, sheet metal, and showcard writing are offered. The enrollment is about 400 in the day-trade and evening classes.

The Atlanta Opportunity School is doing splendid work. Last year the enrollment was about 1,400 in the

day-trade, part-time, and continuation classes. There are no evening classes. This school enrolls both boys and girls. Most of the courses are designed for students just entering employment. In addition to the vocational courses there are classes in the three R's for adults who have not completed their elementary education before going to work.

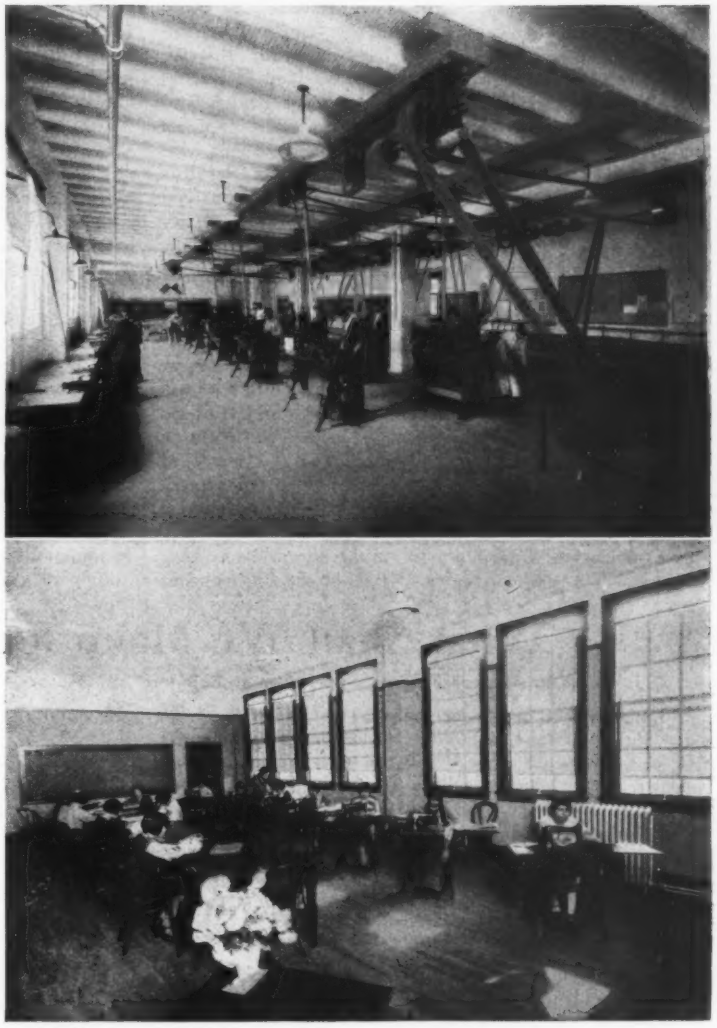
El Paso, Texas, has a new trade school which was built at a cost of $240,000. This is a part of the public school system and over 1,500 students are enrolled in the various classes. The courses are for both boys and girls and include auto mechanics, carpentry and mill work, machine shop, welding, power sewing machine operating, dressmaking, millinery, household service, machine drafting, bookkeeping, typewriting, shorthand, business English, and trade cooking.

Mrs. Brewster, a citizen of Tampa, gave $75,000 of the $110,000, which it cost to build the new trade school at Tampa, Fla. This building will take care of the part-time and general continuation classes, and the day-trade, and evening classes.

Miami, Fla., has recently completed a building for instruction of building trades apprentices.

All this is a very creditable showing for the various states of the South. Much of this has been accomplished in recent years. It is eminently fitting, therefore, that the American Vocational Association should hold its first annual convention in the South.

Edwin A. Lee, director of vocational education, University of California, together with the various vice-presidents have been at work on one of the most comprehensive programs ever assembled. While final details are not completed at this time over 100 speakers from 28 states in addition to Canada and the District of Columbia. This assures a representation for practically every phase of vocational education.



MACHINE SHOP (TOP) AND DRESSMAKING DEPARTMENT (BOTTOM) AT THE VOCATIONAL SCHOOL, EL PASO, TEXAS.

A hasty glance over the preliminary program indicates that in addition to the directors, supervisors, and teachers directly connected with the schools, business and the industries are better represented than has been the case for some years. This type of cooperation on the programs of our conventions is essential if we are to develop the right courses in our schools.

NURSES IN TRAINING AT THE VOCATIONAL SCHOOL, HOUSTON, TEXAS.
(Class in Drugs and Solutions for Probationary Nurses at the Jefferson Davis Hospital, Houston, Texas.)

As an instance of this cooperation the Commercial Education section, under the general leadership of Prof. Fred G. Nichols of Harvard University, has a unique program. This will consist of conferences between business men, teachers and others interested in business training. Cooperating with the A. V. A. in this conference are the following organizations which will have representatives present, selected by the presidents or directors of the organizations:

National Association of Office Managers.
National Retail Dry Goods Merchants Association.
National Commercial Teachers Federation.
Eastern Commercial Teachers Association.
National Education Association—Business Education Department.

Live topics will be discussed. The program committee has over 1,000 questions collected from all over the country on "What Commercial Teachers Want to Know." Representatives of the office managers and the retail associations will be expected to help solve these questions.

Some of the topics to be discussed are, "Recognized Office Trades—What Are They?" "Relative Importance Requirements, etc.," "Store Positions—Training Needed, etc.," "Has Retail Selling Education Justified Itself?"

The Industrial Education section shows evidence of the same cooperation with the industries. The program includes, among others, the following: E. M. Walsh, educational director of the International Master Painters and Decorators Association; Robert L. Coutts, Industrial Relations Manager, International Silver Co.; Henry Burn, president, Wall Paper Manufacturers Association; Webster Tallant, assistant to the president, National Laundry Owners Association.

One session of the industrial education section will consider the progress of the continuation school movement, presented by representatives of the twelve largest American cities.

Another session will consider guidance and training problems of the part-time school. Another, the child in industry. Arthur S. Somers, member of the board of education, New York City, will speak on the Investment of Public Funds for Effective Vocational Education.

In cooperation with the National Vocational Guidance Association a particularly strong program has been prepared. The general topics will illustrate the trend of this program: Developing Comprehensive Services in Educational and Vocational Guidance; Administering Trustworthy Techniques in Educational and Vocational Guidance, and How to Conduct Studies about Occupational Opportunities.

The Agricultural section will discuss important reports which have been in preparation for some time.

The Home Economics section has a dozen topics listed for the three half day sessions. "Fatigue in Home Life and Methods of Reducing It," by Mrs. Frank Gilbreth, of Montclair, N. J., gives promise of putting dishwashing on a scientific and "job analysis" basis.

The Civilian Rehabilitation section has a splendid program which indicates that this work is rapidly assuming a very vital place in the scheme of vocational education in the various states.

Take it altogether, the future of vocational education in the United States looks bright when such great numbers of energetic workers are assembled on such an important program. The final program will soon be ready for distribution. If you are not on the mailing list of the American Vocational Association, write to the secretary, Z. M. Smith, State Director of Vocational Education, Indianapolis, Ind., for a copy and make your plans immediately to attend this important convention.

What Shall We Make for Christmas?

Ora Strange Kilborn, Supervisor of Fine and Applied Art, East Orange Public Schools

Teachers who have never helped the tiny tots and the older children make ornaments to adorn the Christmas tree, or encouraged them to fashion gifts to bestow upon relatives and friends, have missed a worth-while experience.

The gifts described in this article appeal to children and present no difficulties beyond their capability.

A WINDOW DECORATION—A Christmas Bangle
(See Ill. 1, Plate I)

Material Needed

One 7¼" circle of dark green construction paper.
One 7½" circle of red construction paper.
One 1"x4½" strip of red poster paper for candle.
One 1"x4½" strip of white poster paper for candle.
Two pieces 1"x3" black poster paper, for candle holder.
Two circles of black poster paper. The proper size may be obtained by tracing around a half dollar.
One 16" piece of black thread.

Directions

1. Place the green circle upon the red and paste at the edges, not over the entire surface.
2. Make candles from the red and white paper by shaping the upper end. If the verticle edges are held together while cutting the sides will be alike.
3. Fold a piece of white paper, 1"x4", with the two short edges together. From the double paper cut two candle flames.
4. Cut candle holders from 1"x3" black poster paper. Hold the short edges together and cut double.

Cut handles. To secure the circular ring fold the circle through the center and cut an equal distance from the edge.

Arrangement

Arrange the red candle and the black candle holder on the green circle, pasting only at the sides of the holder and near the top of the candle.

Slide the end of the candle flame under the candle and paste.

Paste handles in proper place.

Tie the black thread through both circles about half an inch from the edge. To secure proper hanging the thread must be placed directly above the top of the candle.

Make similar arrangement of white candle on red circle.

Unless care is taken to place the top of the candle directly below the point where the thread passes through the circles the decoration on this side will not appear vertical.

Similar bangles may be decorated with Christmas trees or Christmas stars.

CHRISTMAS TREE ORNAMENTS (I. See Ill. 2, Plate I)

Material Needed

One circle, 1½", of thin white paper (plain news is particularly satisfactory).
Two circles, 1½", of green poster paper.

Directions

Fold the two green circles on the verticle diameter. Place one folded green circle upon the white circle making the right hand edges even. Paste the under half of the green circle to the white.

Turn over so as to place the other green circle upon the white making the left hand edges even and again paste the under half of green circle to white.

Fold outward each unpasted half of the green circle.

This ornament may be made of any two colors but green and white, and red and white are symbolic of Christmas.

Sew a black thread through the circle as near the top as possible and tie close to the circle. Tie the upper ends, thus making a loop that may be easily slipped over a branch of the tree.

The black thread will be almost invisible against the darkness of the tree.

(II. See Ill. 3, Plate I)

Material Needed

Two circles, 4", of plain news paper.
One circle, 4", of green poster paper.
One circle, 4", of red poster paper.

Directions

Fold all circles on verticle diameter, and fringe the edges about ½" deep.

Open the green circle and place flat on the desk. Paste the right hand half of one white circle on the right hand half of the green circle and paste the length of the diameter but only a short distance from the center, thus leaving most of the circle free.

Paste the left hand side of the other white circle to the left hand side of the green circle.

Paste the red circle to the free sides of the white circle.

Paste together one portion of fringe (nearest the center) on opposite sides of each circle. When all are pasted a fluffy ball of three colors will be ready to decorate the tree.

(III. See Ill. 4, Plate I)

Material Needed

Three 3" squares of red poster paper.
Three 4" squares of white paper.

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DECEMBER, 1926.

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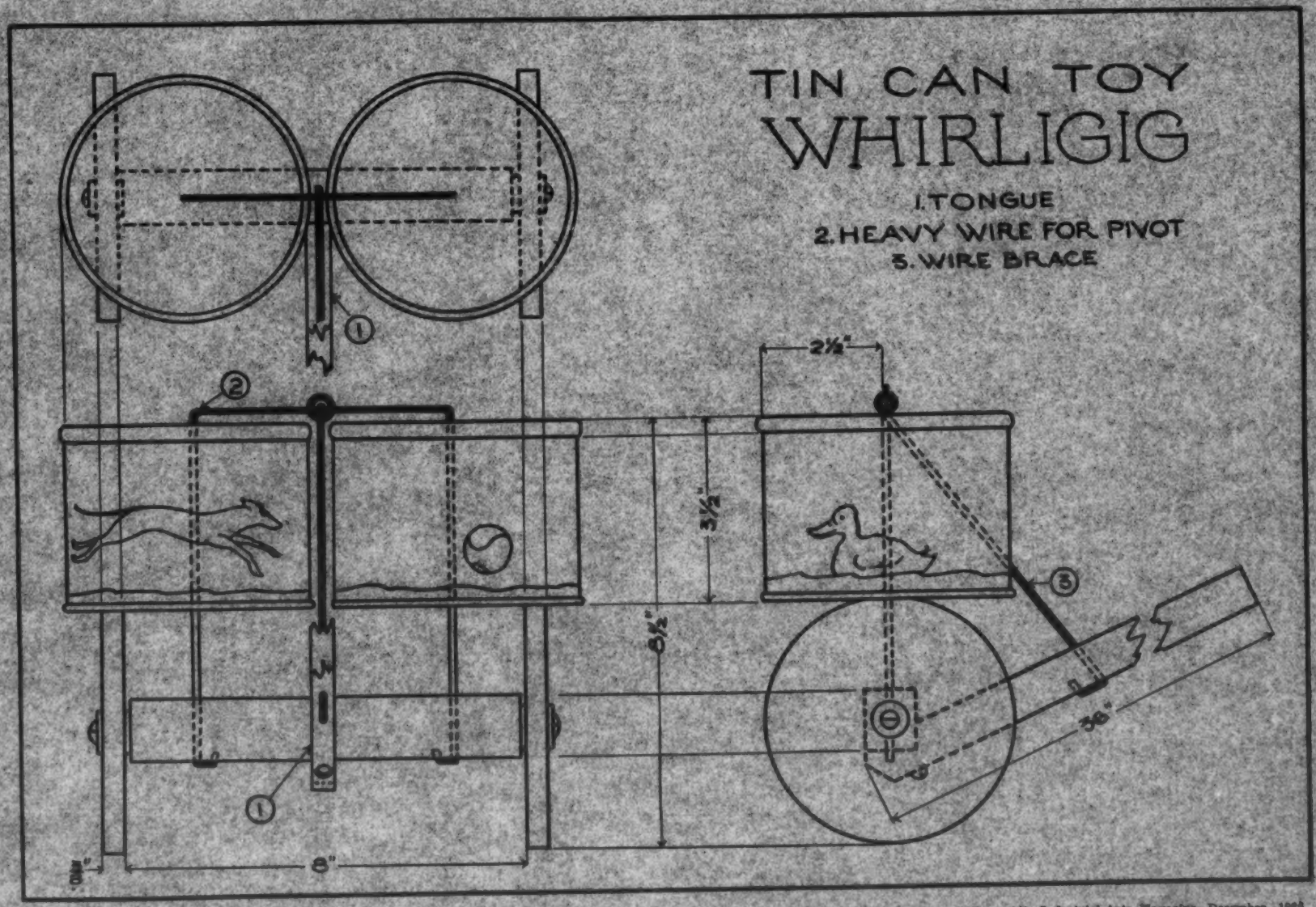
TIN CAN TOY
WHIRLIGIG

1. TONGUE
2. HEAVY WIRE FOR PIVOT
3. WIRE BRACE



Drawing by Chas. M. Rice, Everett, Wash.

For Details see Page 466, Industrial-Arts Magazine, December, 1926.

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THE INDUSTRIAL-ARTS MAGAZINE,
DECEMBER, 1926.

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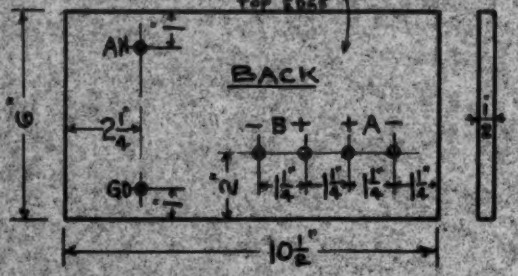
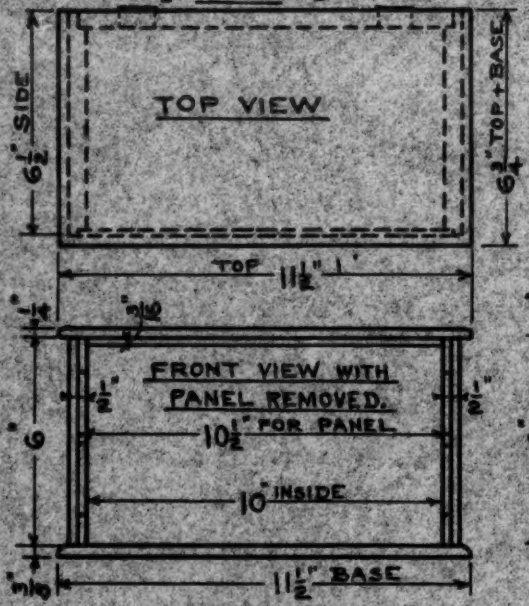
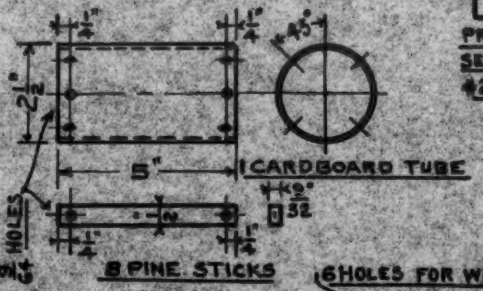
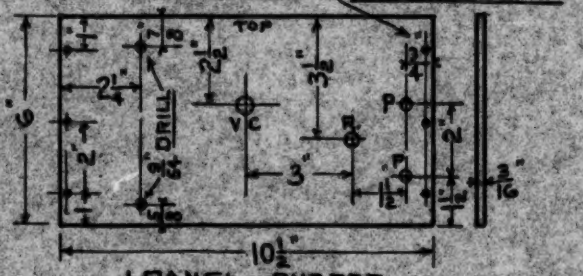
6 HOLES TO SUIT BINDING POSTS



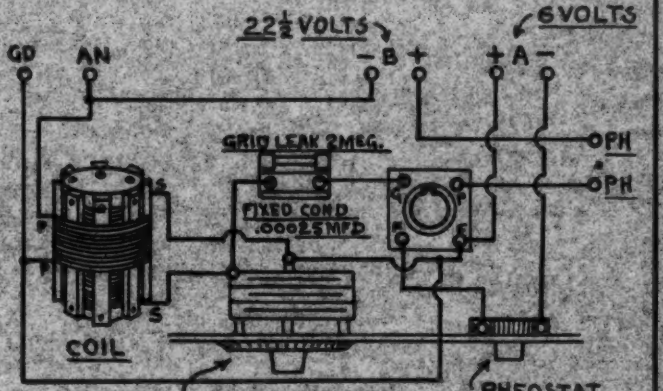
MATERIAL FOR CABINET			
PART	LONG	WIDE	THICK
PANEL	10½	6	3/16
BACK	10½	6	½
SIDES	6½	6	½
TOP (OUT)	11½	6¾	¼
" (IN)	9⅞	5⅝	3/16
BASE	11½	6¾	⅜



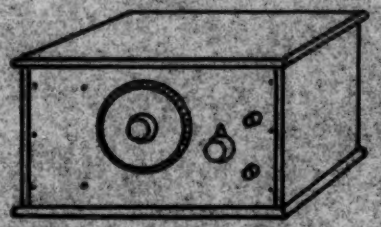


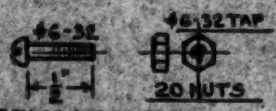


1 PANEL, RUBBER
DRILL V.C. + P. HOLES TO SUIT.
P. HOLES FOR BIND'G POSTS.



WIRING DIAGRAM





18 - BRASS MACH. SCR.

2 COIL BRACKETS, BRASS

ONE TUBE RADIO SET

GE

Drawing by Herbert D. Harper, Jackson Heights, N. Y.

For Details see Page 446, Industrial-Arts Magazine, December, 1926.

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PEDESTAL

Scale

BILL OF MATERIALS FINISH SIZE				
PART	PCS.	L.	W.	T
TOP	1	18"	12"	¾"
BRACES	4	44"	3"	¾"
SPINDLE	1	21½"	1¾"	1½"
"	2	11"	2"	¾"
"	2	11"	3½"	¾"
BASE	1	6"	6"	¾"
FEET	2	14"	4"	¾"

EDGE DETAILS

TOP BASE

METHOD OF CUTTING EDGES

FIG. 1 FIG. 2

FIG. 3

F-FENCE
T-TABLE
S-SAW

FIG. 4

TEMPLATES

TENON BRACE FOOT

HALF-LAP JOINT

SECTION ON A—A

For Details see Page 447, Industrial-Arts Magazine, December, 1926.
Drawing by Richard Shaver, Fredonia, N. Y.

UNIV OF MICH

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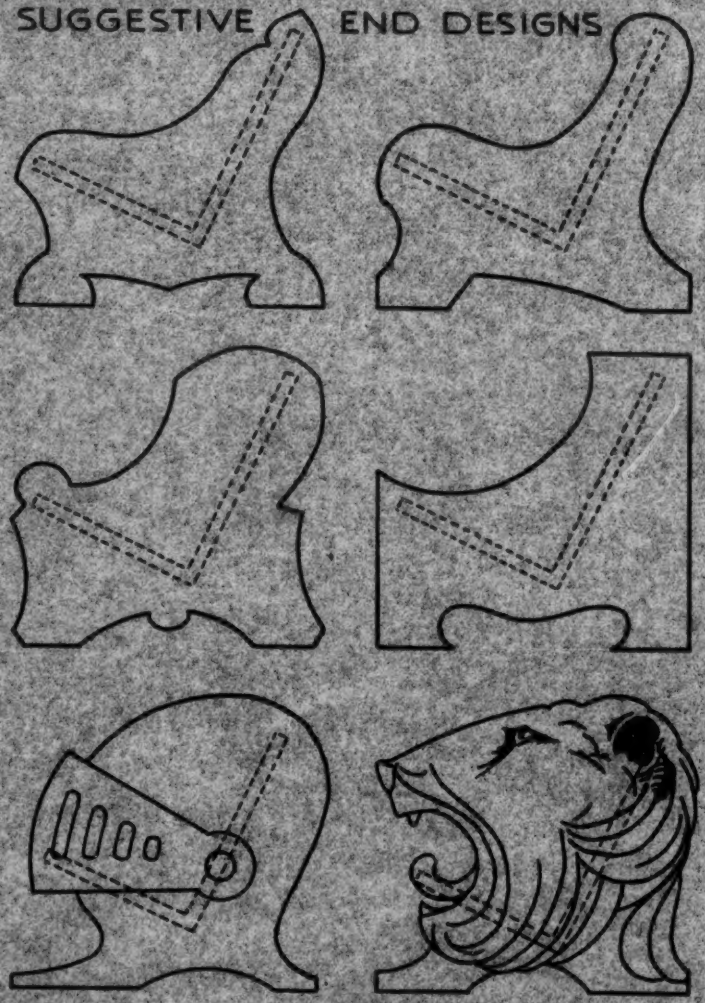
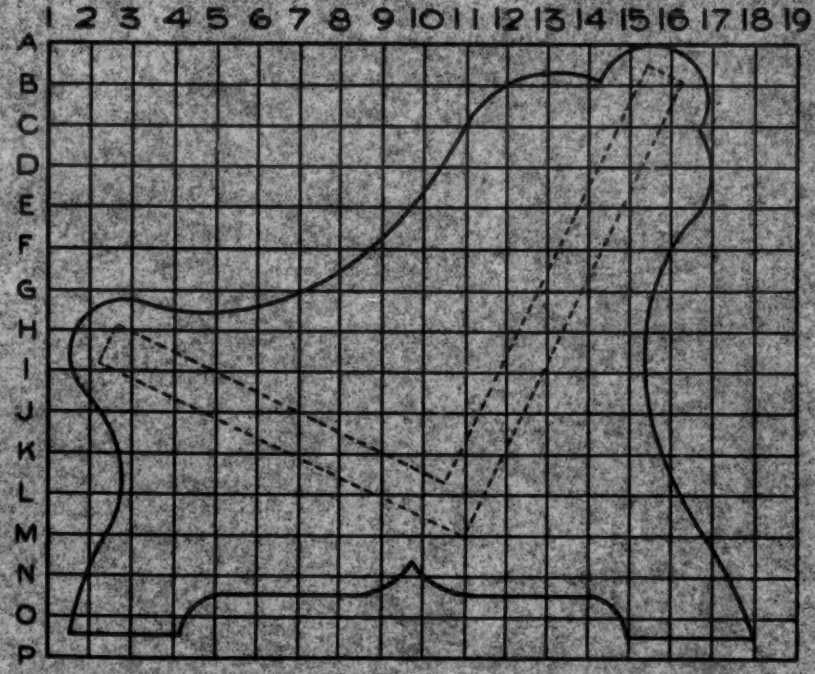
BOOK RACK

ALL PARTS OF 1/2 INCH STOCK

SUGGESTIVE END DESIGNS





LENGTH OVER ALL 18 INCHES

Drawing by A. E. Gray, Stockbridge, Mass.

For Details see Page 456, Industrial-Arts Magazine, December, 1926.

Directions

Fold each square on its diagonals and fringe the open edges. Cut from the middle of the outside edges directly towards the center and continue towards the right hand corner making the cuts more diagonal as they approach the corners. Turn the square over and repeat the operation. Unfold and paste each red square upon a white square.

Fold up and paste the left hand half of one square to the right hand half of another. Paste the remaining square to the two already joined together and a three-cornered ornament will be the result.

IV. ORNAMENTAL BASKET (See Ill. 5, Plate I)

Material Needed

One 3″ square of white paper.
One 4″ square of red or green poster paper.

Directions

Paste the red square on the center of the white square.

Place the white side on the desk and fold on diagonals.

Fringe the edges of the white square that project beyond the colored one.

Unfold and cut on one diagonal as far as the center. See Ill. 1, Plate II. Paste section A upon section B.

Fold the white fringe outward and add three handles ¼″ wide and 3½″ long.

Paste each handle along the center of each side, and together at the top.

BOX FOR TABLE DECORATION. May be used for candy or nuts (See Ill. 6, Plate I)

Material Needed

One 5″ circle of white paper.
One 5″ square of green poster paper.

Directions

Find the center of the circle by bringing opposite edges together and making a very short crease near the center. Repeat with the other two opposite edges and mark the point where the two creases cross.

Turn the top and bottom of the circle to this point and crease. Unfold and repeat the operation with the other two sides.

See Ill. 2, Plate II. Cut on the dotted lines and paste.

By this method of cutting and pasting each side of the box will be strengthened by a lap.

Decorate each side with a Christmas tree. See Ill. 6, Plate I.

Ill. 3, Plate II, shows an easy way of cutting the tree. Fold a piece of paper 2½″x2½″ and cut first on the full lines and then on dotted.

Red or green boxes decorated with white trees are also very effective.

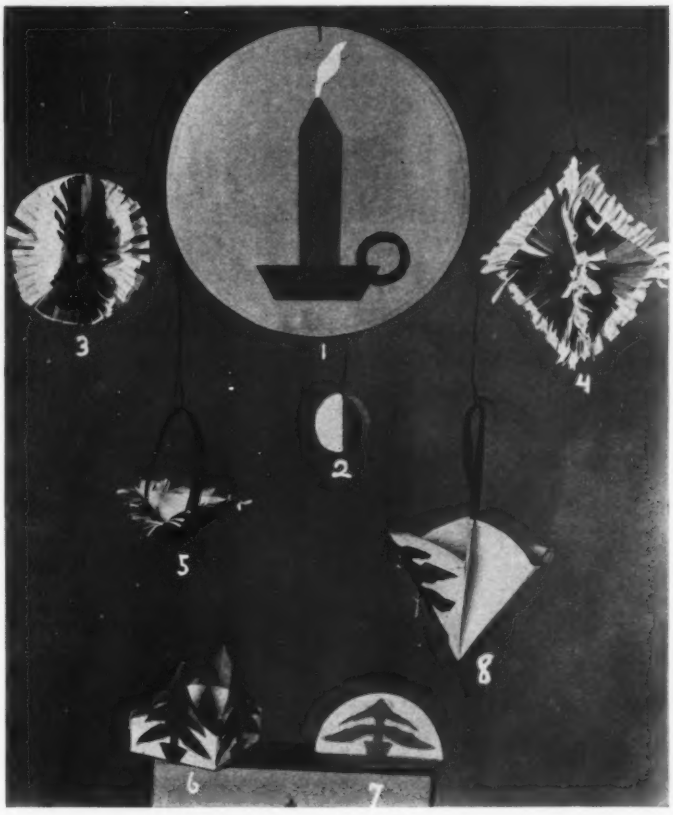
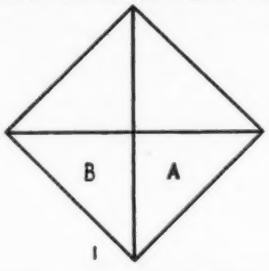
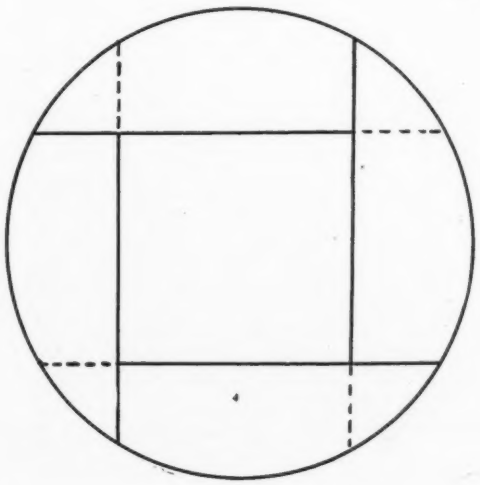


PLATE I, ILLUSTRATIONS 1 TO 8.



1

3



2

PLATE II.

A PLACE CARD (See Ill. 7, Plate I)

Directions

Fold a 3″ circle of white paper on a horizontal diameter. Fold one half to the center and paste. Turn the circle over and fold up the semi-circle. Decorate this with a small Christmas tree and write the name on the portion resting on the table.

A DOUBLE HANGING BASKET

Fold a 7½″ circle into eight equal parts by folding on two diameters and two diagonals.

Unfold and place on the desk with one diameter vertical and the crease on the upper side.

Attach handle ½″x7″ by pasting one end at the right of the lower end of the diameter and the other end at the left of the upper end.

Fold up the circle, lap one end of the handle over the other and fasten by sewing one long stitch through handles and both sides of the basket.

Decorate with Christmas tree. See Ill. 8, Plate I.

A CALENDAR

Decoration—imaginery flower forms

Material Needed

Four ½″x12″ construction paper for mount.
Colored poster paper for flowers and leaves.

TRACING SUPPLEMENT No. 48, INDUSTRIAL-ARTS MAGAZINE, DECEMBER, 1928.

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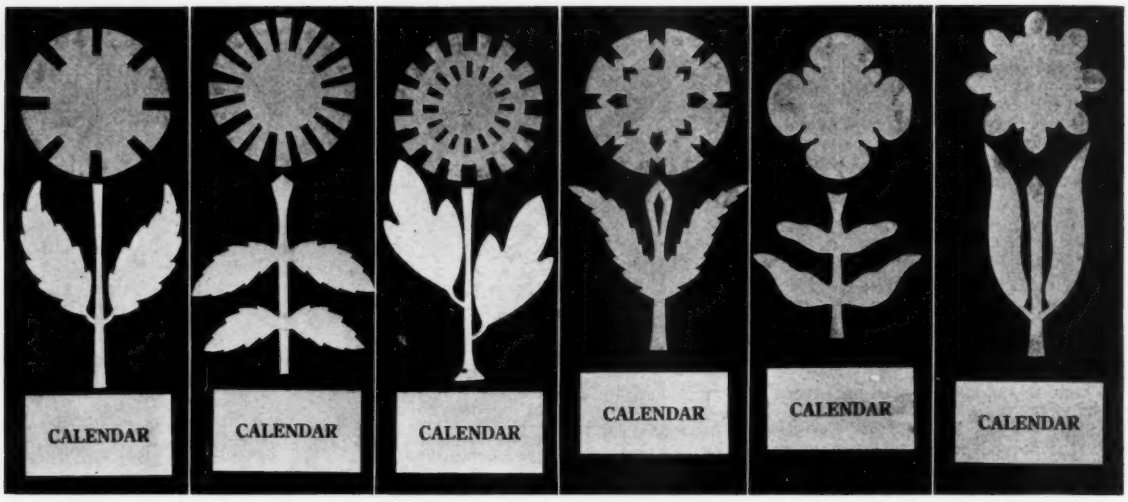


A B C D E F

Cord for hanging.
Calendar pad.

Directions

I. Flowers.

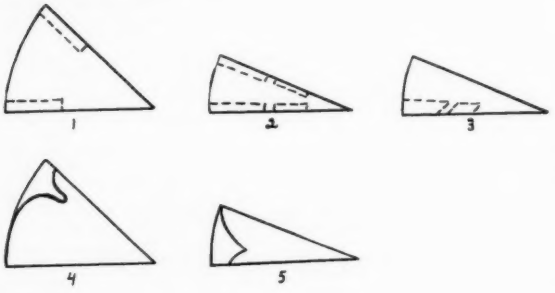
1. Each pupil will need an outline drawing of a 3½" circle which he may trace around and cut out to use as a pattern. The teacher should provide one for the pupil occupying the front seat of every row. These pupils may cut out the circle, trace around it and pass the pattern to the pupil behind him, and so on until all have been supplied. Manila drawing paper will be sufficiently heavy for this purpose.

2. Trace around and cut a number of circles from thin white paper. Plain news paper is particularly satisfactory.

3. Cut simple flower forms. See Plate III.

(1) a. Fold the circle on the horizontal diameter.

b. Hold the folded edge towards you and fold on the verticle diameter.



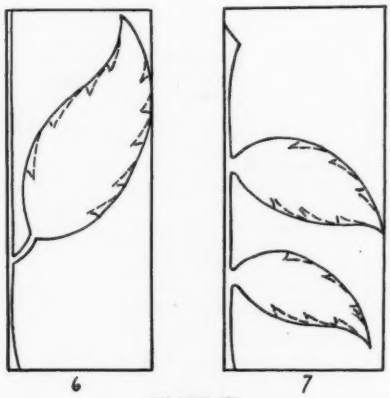


PLATE III.

c. Hold the circle so the folded edges are at right angles. Fold on diagonal of the circle. See Ill. 1. Cut on dotted lines. (Note cut is made almost to the center of the diagonal.) See completed calender A.

Each time a flower form is cut the teacher should make a large blackboard sketch. The cuttings will show wide variation according to the interpretation of the individual pupil.

(2) Fold according to directions given in 1, then fold again on the diagonal and cut as previously directed. See calendar B.

(3) Follow directions given in 1 and cut on dotted lines as shown in Ill. 2. See calendar C.

(4) Follow directions given in 2. Cut on dotted lines shown in Ill. 3. See calendar D.

(5) Fold circle as directed in 1 and cut on dotted lines shown in Ill. 4. See calendar E.

(6) Fold as directed in 2 and cut on the dotted lines shown in Ill. 5. See calendar F.

After these suggested cuttings have been made pupils should be encouraged to make their own flower forms. All should be kept and a choice made after leaves have been made.

II. Leaves. Cut from plain news 4"x5". See Plate III.

1. Fold on vertical diameter. Draw stem and leaf See Ill. 6. Note that the leaf stem starts slightly more than quarter way from the bottom of the stem and the leaf touches the outside edges of the paper about a quarter of the way down.

Cut outline first and then notches as shown by dotted lines. Note that every notch touches the outside edge of the leaf. See calendar A.

2. Plain news 4½"x5". Fold on vertical diameter and draw outline of stem and two leaves. See Ill. 7. Note that lower leaf points directly towards the lower right corner and that the upper leaf touches the open edges slightly below the center. The stem below the two lower leaves is somewhat shorter than between the two pairs of leaves. See calendar B.

For other variations of leaf forms see all calendar illustrations.

Leaves may be cut from a folded piece of paper and attached to the stem at different points. See calendar C. This will be found to be a somewhat more difficult problem.

III. Stems.

Stems should be considerable wider at the base and grow smaller as they approach the flower. The top should be cut to harmonize with the part of the flower form that it adjoins.

IV. Color schemes.

	Background	Stems	Flowers	Leaves
A.	Grayed orange	Black	Orange	Black
B.	Grayed yellow	Orange	Light orange	Orange
C.	Grayed blue violet	Light violet	Light blue	Light violet
D.	Gray	Blue green	Light blue green	Blue green
E.	Grayed Green	Dark green	Light green	Dark green
F.	Medium brown	Black	Light yellow orange	Black

V. Arrangement.

The flower form will be more effective if a small irregular center is added. This should be of the same

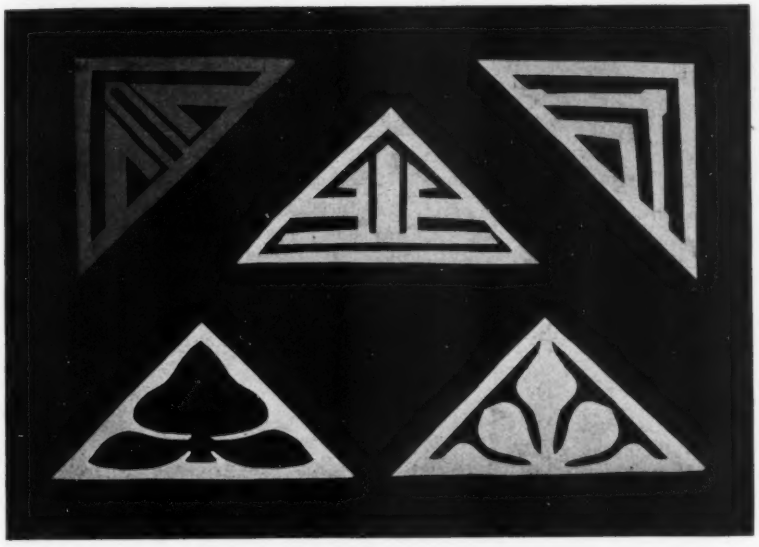


PLATE IV. DESIGNS FOR BLOTTER CORNERS.

color as the leaves and about one-fourth as large as the entire flower form. The calendar pad may be pasted upon a piece of colored paper before placed in its proper position. This should be the same color as the leaves and large enough to show slightly on all four sides of the pad.

After both directed and orginal flower forms, leaves and stems have been cut pupils should select those that please them most and be encouraged to make various arrangements until they are satisfied that they have the best possible.

VI. Pasting.

The whole surface of the calendar pad should be pasted but only a small portion of paste should be applied to the apex of the leaves, top and bottom of the stems and the outer portion of each flower petal.

A DESK BLOTTER WITH ORNAMENTAL CORNERS

Material Needed

1 piece of bookbinders' board, 10"x14½".
2 pieces of construction paper, 2"x11½".
2 pieces of construction paper, 2"x7".
2 pieces of construction paper, 5½"x5½".
1 piece of construction paper, 9½"x14".
1 blotter, 9½"x14".

Method of Construction

1. Fold and crease each piece of construction paper 2"x11½" with long edges together. Unfold and bind each long side of binders' board leaving 1½" space at each end.

2. Fold each piece of construction paper 2"x7" with the long edges together. Unfold and bind each short side of the binders board leaving 1½" space at each end.

3. Draw a line 1" from each side of the two 5½" squares. Draw one diagonal on each square. Cut on diagonal. Cut off triangle at each end of the diagonal. Cut out square in each remaining corner. Bind the triangular pieces over each corner of the board and miter the corners.

4. Paste the construction paper 9½"x14" on the back, leaving ¼" margin.

5. Decorate corners. Design should be produced by paper cutting, then traced and painted. Fold a 3½" square on a diagonal and cut. Many designs should be made before a final selection is made. All designs should be bisymmetric. These may be secured by folding the triangle. All cuts should follow structure (should be parallel with either the edges or the fold). See Plate IV.

6. When the design is painted pupils should be cautioned to paint the part represented by the paper, not by the spaces. This will strengthen the corners and make the design exemplify the principle of structural unity.

7. The design should be painted in a color that will harmonize with the paper and the blotter. Plate V shows a corner of a completed desk blotter.

PLATE V. BLOTTER CORNER.

INDIANA VOCATIONAL SOCIETY MEETS

The Indiana Society for Vocational Education held its annual meeting October 21st in conjunction with the 73rd annual meeting of the Indiana Teachers' Association at Indianapolis, Indiana.

Thursday morning was given over to a general program where all groups of vocational interests met together. The meeting was addressed by Dr. Edwin A. Lee, of the University of California, and President of the American Vocational Association, and by Mr. E. W. Barnhart of the Federal Board for Vocational Education. Dr. Lee spoke on "Vocational Education and the Public Schools" and Mr. Barnhart on "Vocational Commercial Education in the United States." Over 500 teachers and administrators were in attendance at the meeting.

The Society held a luncheon meeting at 12 o'clock, in the Chateau Room of the Claypool, which was attended by 186 members. The program was informal, being given largely to getting acquainted. The girls' glee club of the Arsenal Technical high school, under the direction of Miss Elizabeth Kaltz, furnished the music. A short business session was held at the close of the luncheon, at which the following officers were elected:

President, R. W. Gregory, Purdue University (re-elected); vice-president, Harry E. Wood, Vocational Director, Indianapolis (re-elected); secretary-treasurer, Miss Mary Beeman, State Supervisor Home Economics, Indianapolis (re-elected).

Directors: Agriculture, H. G. Kolb, Spencer; Industry, Guy Stantz, Terre Haute; Home Economics, Esther Amick, Rushville; Commercial, George M. Crossland, Indianapolis.

The name of the Society was changed to Indiana Vocational Association, to conform to the American Vocational Association with which the Indiana Association is affiliated. A membership drive was launched which will culminate at the first annual meeting of the American Vocational Association in Louisville, December 2-3-4. Two hundred members were secured in the initial drive.

R. W. Gregory.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

WHIRLIGIG

C. M. Rice, North Junior High School, Everett, Wash.

(See Supplement No. 37)

The wheels, axle, etc., may be made to correspond with the size of the can selected. Find two cans of the same appearance. Punch a hole in the center of each end. This should be done with a jig to get the best results. If the wheel is the same diameter as the can, the wheel may be used for finding the centers. The drawing will explain the other details. Finish with paint.

A RELIABLE ONE TUBE SET

Herbert D. Harper, Jackson Heights, N. Y.

(See Supplement No. 38)

Many novices and amateurs have tried to construct radio sets from plans and specifications but, in some instances, these attempts have ended in failure. This must be attributed to the careful observance of instructions on the one hand where success has been achieved, and the apparent neglect of seeming minor details on the other hand, where failure resulted.

The following directions give in detail the construction of a one-tube set which is simple, reliable, selective and which agreeably surprises and does not disappoint the builder if the following instructions are carefully carried out.

Materials needed are:

(1) A cabinet, 6"x10"x5½", inside dimensions (see drawing).
(2) A rubber or wooden panel, 6"x10½"x$\frac{3}{16}$".
(3) Eight binding posts.
(4) A 3½" diameter dial.
(5) One variable condenser (either a 21 or 23 plate).
(6) One fixed condenser, .00025 M. F. D. capacity.
(7) One grid leak, 2 Meg.
(8) One rheostat (30 ohms).
(9) One tube socket.
(10) One audion (W. D. 11 or U. V. 201-A).
(11) One antennae coil (which the constructor can make himself).
(12) Bus bar.
(13) 18 R. H. Mach. Scr. Brass, about ½" in length.
(14) Eight wooden sticks, 5"x½"x⅝".
(15) One 2½" diameter cardboard tube 5" long.
(16) One bottle of orange shellac.
(17) One B battery (22½ volts).
(18) Dry cells.
(19) 130 feet of copper strand wire.
(20) 12 feet of number 16 copper wire.
(21) One spool of number 22 cotton-covered wire.
(22) Two porcelain insulators for antennae, and one porcelain tube insulator for lead in.
(23) One lightning arrester or one knife switch.

With the aforesaid materials at hand, we are now ready to proceed with the construction of the set.

Place the cabinet with the back toward you. Then drill eight holes as follows:

In the lower right hand corner 1¼" from the side and 2 inches from the bottom, drill one hole $\frac{3}{16}$" in diameter. Next drill another hole 1¼" to the left of the first. These two are for the A battery binding posts. To the left of these, drill two others spaced 1¼" apart. The latter two are for the B battery binding posts. Letter or mark all binding posts.

Drill another hole one inch from the bottom and 2¼" from the left hand side. This is for the ground binding post. Directly above the latter and one inch from the top, drill a hole for the antennae binding post. The binding posts are placed in the rear as a matter of convenience. Fasten the panel to the front of the cabinet by means of six wood screws.

Now place the cabinet with the panel facing you. Five and one-quarter inches from the right hand side, and 2½" down, drill a hole large enough for the shaft of the condenser. Drill other necessary holes to mount the condenser. Next, drill a hole 3½" down, and 2¼" from the right hand side of the panel. This hole is for the shaft of the rheostat. Drill other necessary holes to mount rheostat. Furthermore, two holes are necessary to mount the phone binding posts. Drill one of these 1½" from the bottom of the panel, and ¾" from the right side. Above this, drill another spaced 2" from the lower hole.

Next proceed with the making of the antennae coil. Paint the eight wooden sticks and the cardboard tube with orange shellac, also the six holes in the rear of the cabinet. This must be done thoroughly. Dip a match stick in shellac and insert in each hole. These precautions are taken to prevent current loss. Furthermore, if a wooden panel is used, the same must be painted with shellac on the inside, outside and all edges and holes.

After the shellac is thoroughly dried, bore a $\frac{3}{16}$" hole one-quarter of an inch from the end of the cardboard tube. Insert a screw from the inside. Take a spool of No. 22 cotton covered wire, and fasten one end of the wire to the screw, allowing ten inches for connections, and begin winding. Continue until 68 turns are made, and then make another hole and insert screw. Fasten wire to screw. Then allow 10" for connections and cut wire. Next take one of the eight wooden sticks and drill a $\frac{3}{16}$" hole, ¼" from the end. The half inch side of the stick should be toward you. Carefully measure the distance between the centers of the two screws inserted in the cardboard tube. Then drill another hole in the stick at a distance from the other hole equal to the distance you measured. The seven other sticks should be drilled in the same manner. Fasten one end of one of the sticks by means of the first mentioned screw, and tighten the nut. Fasten the other end of the stick in a similar manner to the other end of the tube. Each of the seven other sticks should be fastened in the same manner and spaced at an angle of 45 degrees, or in other words, they should be the same distance apart. The primary must be wound over these sticks in the same direction as the secondary, and consists of eleven turns.

Fasten each end of the primary to a convenient screw, allowing about ten inches of wire at each end for connections.

Proceed now to make the various connections. Fasten the antennae coil to the front panel by means of two angle brackets, being careful, however, that the side of the coil does not touch the left-hand side of the cabinet. Furthermore, the top of the coil should not touch the lid when the cabinet is closed. Fasten the upper end of the primary to the antennae binding post in the rear of the cabinet. Fasten the lower end of the primary to the ground binding post in the rear of the cabinet. Connect the lower end of the secondary winding to the stator or fixed plates of the condenser, about five inches from the end of the wire, and then without breaking the wire, fasten the end of said wire to one of the binding posts of the grid leak. Now connect the other binding post of the grid leak to the grid binding post of the audion socket. The fixed condenser of .00025 Mfd. is connected in parallel to the grid leak. Now fasten the top end of the secondary winding to the rotor plates of the condenser, about five inches from the end of the wire, then without breaking the wire, connect the end of the wire to the A-plus binding post of the audion socket. Also connect the A-plus binding post of the audion to the ground binding post. Again,

connect the A-plus binding post of the audion to the A-plus binding post mounted on the rear of the cabinet. Connect the A-minus binding post on the rear of the cabinet to one of the binding posts of the rheostat, and join the other binding post of the rheostat to the A-minus terminal of the audion. Again, join the plate terminal of the audion to one of the phone binding posts mounted on the panel. Connect the other phone binding post to the B-plus binding post mounted on the rear, or rather, the back of the cabinet. Join the B-minus binding post on the back of the cabinet to the antennae terminal. Fasten the dial to the shaft of the condenser, but be careful, however, that the dial does not touch the surface of the panel.

Just a few words in regard to the antennae. Perhaps the T type is the best. The strand wire should only touch porcelain insulators and should be kept at least a few feet from the side of the building.

The ground wire should be insulated, and should be connected to a cold water pipe or a steam radiator pipe. A clamp should be used after the pipe is carefully scraped, to make a clean connection. In other words, a good and secure connection should be made with the pipe.

If the set oscillates too much, remove one of the turns of the primary of the antennae coil. In any event, the set should oscillate at least a trifle, especially if D X is desired. If no oscillation is desired, turn down the rheostat, just below the critical point of the tube.

PEDESTAL

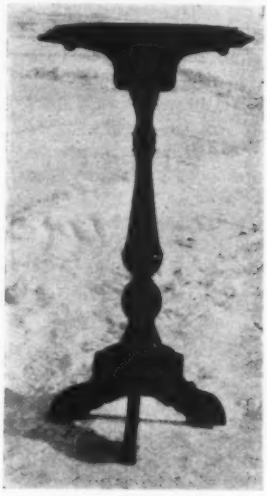
Richard Shaver, Fredonia, N. Y.

(See Supplement No. 39)

This pedestal has the double advantage of being a favorite of the student because of low cost and attractiveness, and of the instructor because of the great variety of experiences which it gives the boy. It can be worked out as a hand tool job, as a machine job, or a combination of both. The following instructions are intended for the latter, but can easily be changed for either of the other types of construction.

Before the job is started, the boy works out a large size assembly drawing of the pedestal in the related drafting class, working from detail drawings. This gives a good idea of its construction, and allows him to work out full size templates of the feet and braces. He works from his own drawing as far as possible, and as he has thought it through while drawing it, is ready to go on with the actual woodworking without any loss of time or waste of materials, and with a minimum of help from the instructor. Each part or group of parts is completed before the assembly is started.

Top. Square up a piece of stock to 12″x12″, and lay out the octagon on the under side. Cut on the variety saw with the cross-cut guide set at 45°, using a mitre or other smooth cutting saw. The top is then ready to be edged, which is done on the variety saw, and finished with sandpaper. Set the ripping fence ⅞″ to the right of the saw, so that with the ⅛″ thickness of the saw, it will give the desired distance (1″). Set saw to project ⅛″ through table. Make cuts (Fig. 1) with top of pedestal down on table of saw, parallel to each edge of the octagon. Next set the ripping fence ½″ to the left of the saw and tilt the table to about 15° from horizontal. Run saw up 1″ or until it cuts into the first saw kerf (Fig. 2). Hold the under side of the top tightly against the fence and the top of the saw table, and cut off each of the eight edges. This makes a pleasing edge and can be left this way for sanding if desired. One more set is necessary to make the edge as illustrated. Move the fence ⅛″ nearer the saw and lower the saw ⅛″ or ¼″ and cut again as before (Fig. 3). It is always well to have several pieces of scrap of the same thickness as the top to test the cuts, before cutting the top itself. The edge is finished by sandpapering and rounding if desired.



PEDESTAL

Base. Square up 6″x6″, lay out octagon, and cut as before. The edge is similar to that on the top, but requires different sets, as can be seen from the base edge detail. It is a good check up on whether or not the student has understood the method of edging the top.

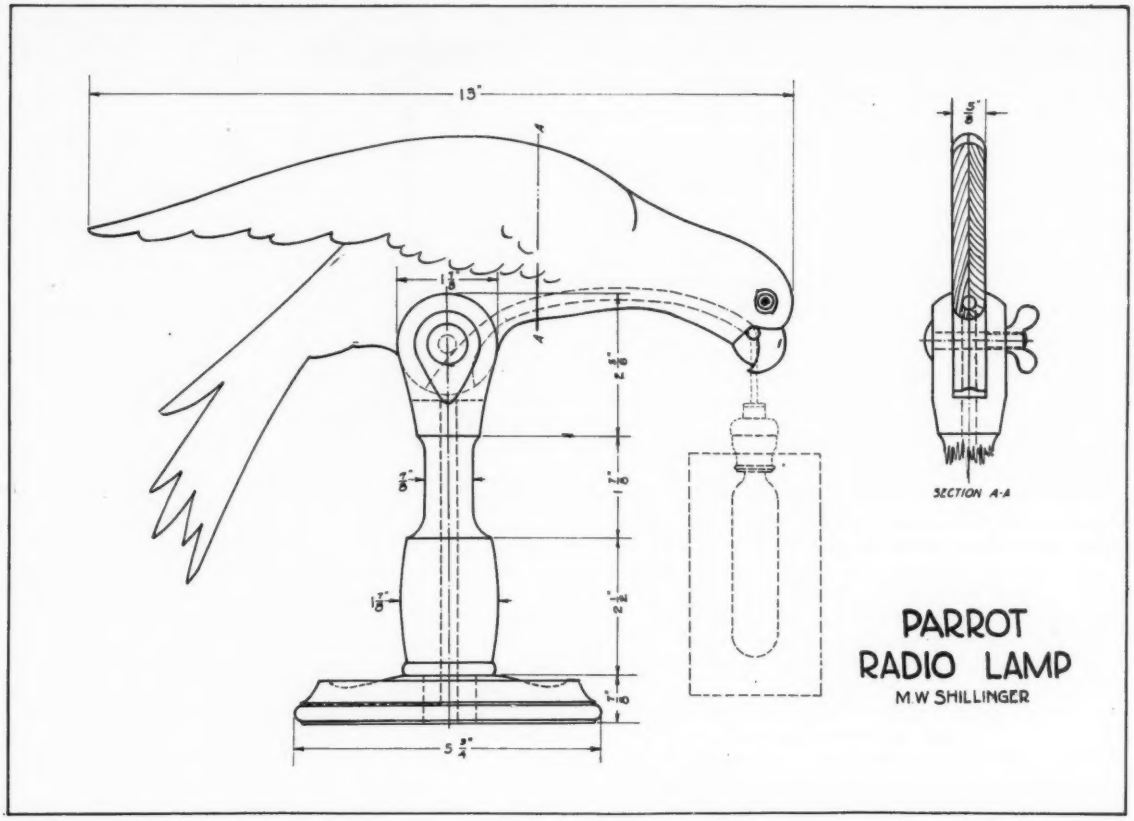
Spindle. The spindle is next glued up as it requires two gluing operations with sufficient time for the glue to set properly. While the glue is setting, the feet and braces may be cut out and sanded. The center piece of the spindle is first squared up on the jointer to 1¾″x1¾″ and cut to about 21½″ long. Then the two narrow pieces are glued on opposite sides at the end to be used for the bottom and as they are 2″ wide, they will project ⅛″ on each side. When the glue is hard, the edges can be easily removed by the jointer by dropping the front table clear, and starting the cut with the long projecting part held down on the back table. This removes just that part of the block which projects below the center piece, and produces a flat gluing surface for the last blocks which are next glued in place. When this is dry, square up on the jointer and saw the end off square at the bottom. Remove the corners on the jointer until an octagon is formed, which is left for the shape at the bottom when the rest of the spindle is turned. It is very essential that both ends be carefully centered. After turning, cut the mortises for the braces. If this is to be done in a mortising machine, it will be found convenient to place a ⅞″ strip under and another back of the piece to offset the larger diameter at the bottom.

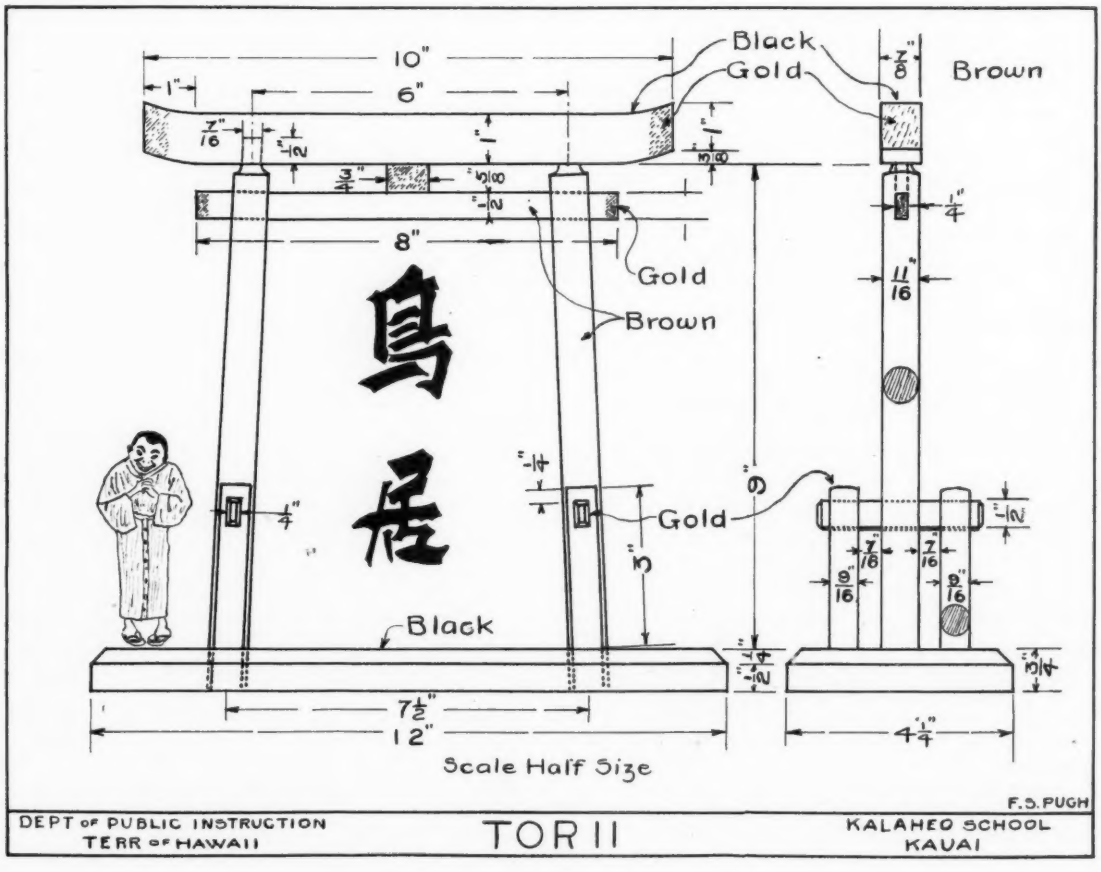
Braces. The pieces of stock for the braces should have one edge jointed and one end sawed square. Lay out from a template so that the jointed edge is at the top and the square end is for the tenon. Cut the tenons, band-saw to shape, and sand either by hand or with a spindle.

Feet. The stock for the feet is squared up to ⅞″x4″x14″ and laid out from the template. By squaring up before band-sawing, the top and bottom edges are sure to be parallel and so insure a good joint with the base. Cut the half lap or middle lap joint, and glue together.

Assembly. The braces are first glued into the spindle. If this job is done upside down on a flat surface, the tops of the braces can be flattened down so that the top will fit well. The shape of the brace permits clamping with a Jorgensen without shaped blocks. The top is attached by means of short screws through the narrow parts of the braces. The base is attached to the spindle by screws so placed that their heads will be covered by the bottom of the spindle. The spindle is screwed to the base from the underside. Care should be taken that the base and top edges are parallel.

Finishing. The entire job is now sponged and sanded with No. 0000 sandpaper. We like a finish produced with successive coats of the following: Water stain, white shellac (cut), filler, white shellac, and one or two coats of varnish. Steel wool is used to rub the first coats and the last coat is finished with pumice in oil.


15"
SECTION A-A
PARROT
RADIO LAMP
M.W SHILLINGER


10"
1"
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Black
Gold
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Gold
Brown
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12"
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Scale Half Size
F.S.PUGH
DEPT OF PUBLIC INSTRUCTION
TERR OF HAWAII
TORII
KALAHEO SCHOOL
KAUAI

PARROT RADIO LAMP

M. W. Shillinger, Grand Rapids, Mich.

The radio lamp, the design for which is shown, has been quite popular with the boys in the woodworking classes and makes a novel lamp when the work is neat and the coloring attractive.

The base is turned from inch stock and the post from a piece two inches square. Both offer opportunities for original design, and as they are to be painted or enameled in suitable colors the kind of wood is not important.

The bird is made from two pieces of wood ⅛" thick. When these are bandsawed they should be nailed together with small brads so that the edges match. After they are cut out the curve of the groove should be marked from a pattern so that the two grooves will match. They should be about one-fourth of an inch wide at least. Care must be taken that these grooves are smooth and that no surplus glue is pressed into them when the two halves are glued together. This would interfere with the free passage of the wires.

A hole is bored through the center of the post and one through the back part of the base edgewise to meet this one. The bolt through the top of the post to hold the bird is an ordinary carriage bolt fitted with a wing nut for adjusting the height of the lamp. The wires pass together through the base, the post, and the bird, until they reach the base of the bill. Here they are separated and drawn out at opposite sides of the head and attached to the small socket underneath. The addition of a piece of felt under the base, a small fifteen-watt light bulb, and a parchment shade colored or decorated, completes the lamp.

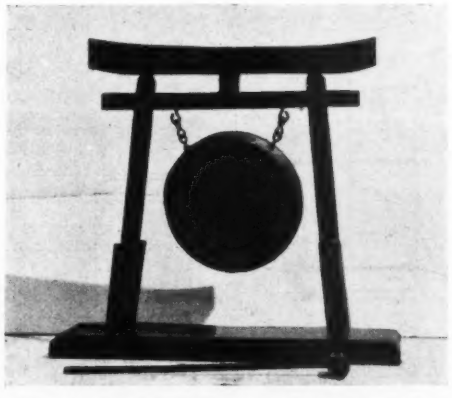
A priming coat, such as shellac, is put on before the wood is painted. Oil paints for the colors on the parrot are probably best. Brilliant red, yellow, and blue are the only ones needed, unless bright green is used to avoid mixing the yellow and blue to obtain this color. There is no bird shown in colored illustrations more than the parrot and it is not difficult to find some from which to work.

This lamp gives sufficient light to illuminate the dials of the radio, and the appropriateness of the parrot design is seen when one considers the uncanny sounds which radios sometimes produce.

TORII OR JAPANESE TEMPLE GATE

Frank S. Pugh, Kalaheo, Kauai, Territory of Hawaii

Here is a seventh or eighth grade problem that appeals to both pupil and teacher for it is simple to construct, artistic in appearance, and can be used for photograph frames, dinner gongs or milady's mirror.



TORII OR JAPANESE TEMPLE GATE DESIGN MADE BY STUDENTS IN THE SEVENTH GRADE OF THE KALAHEO SCHOOL, HAWAII, UNDER THE DIRECTION OF MR. F. S. PUGH.

The round pieces are cut on the Stanley dowel machine and the top piece is cut with a turning saw or a coping saw. Before cutting the round pieces from the square, the mortise openings should be laid off and cut out as it is easier to do so then than after it is rounded. The several pieces are sanded before assembly and are then glued, after which the work is given three coats of brown enamel; a chocolate color is preferable if it can be obtained. The top and base are painted with three coats of black enamel. The ends indicated on the sketch are either painted with a bright yellow enamel or gilded. A gang hammer can be made from a 1½" piece of ¾" dowel and a handle of reed or ¼" dowel. We use chop-sticks for handles.

A jig for cutting the holes at the proper angle should be made so as to have them fit accurately. If a gong is wanted, it is simply gotten from a piece of ⅛" brass 5" in diameter with the edges beaten over on a home-made stake or anvil. Photographs or mirrors are simply hung in the same manner as the gong shown in the photograph.

WILLIAM-AND-MARY PERIOD STYLE TYPE OF LEGS

Anton Anderson and Alan H. Nicol, Buffalo, N. Y.

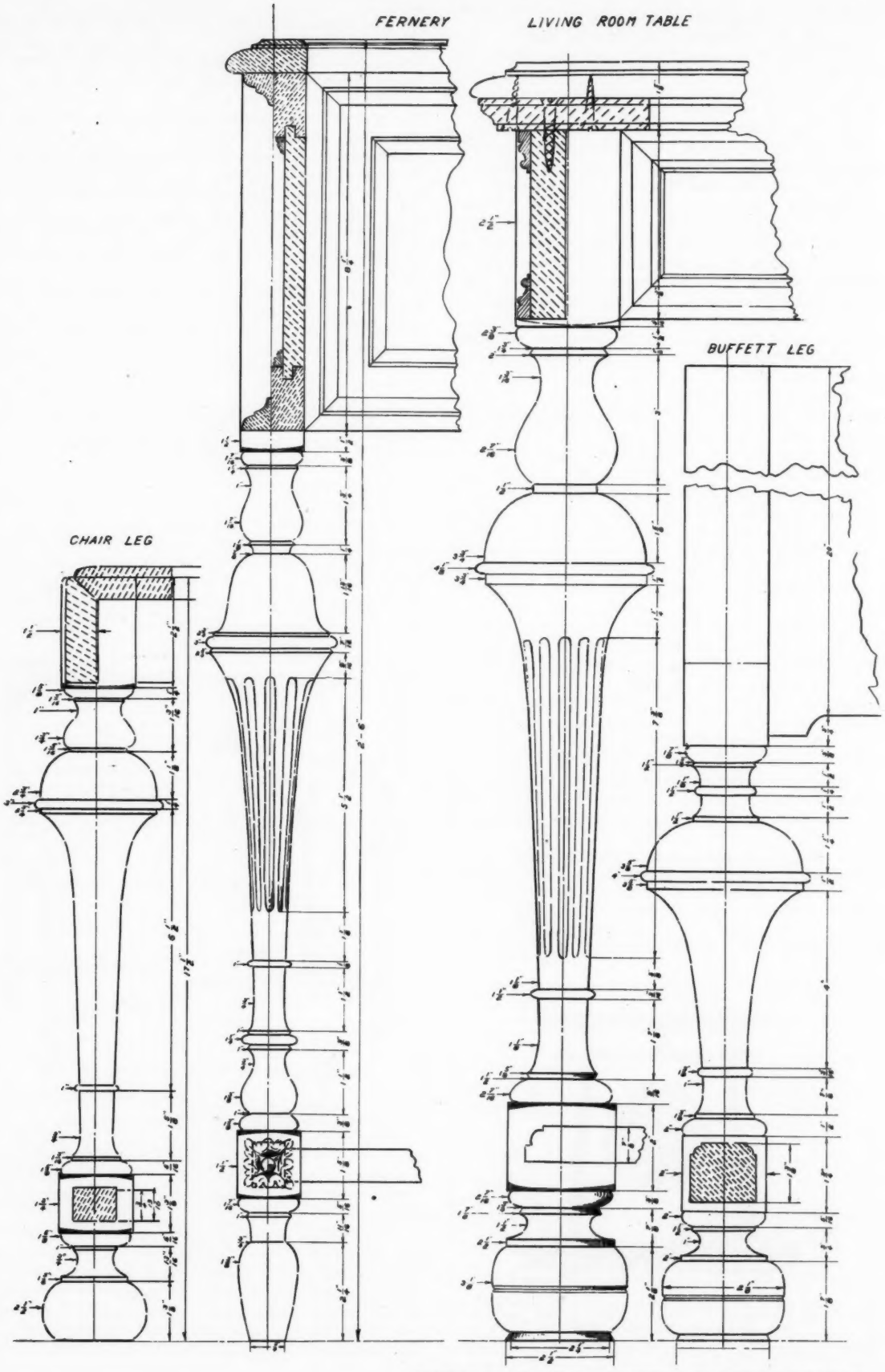
Since the writer's articles have appeared in the INDUSTRIAL ARTS MAGAZINE there have been a number of requests for drawings of turned work of various descriptions. These requests for a higher type of work than has been carried on heretofore are merely additional evidences of a continued professional growth on the part of the industrial arts men, and a continuous improvement in the tools and equipment with which the instructors are able to carry on a grade of work of a higher art value.

A WILLIAM AND MARY TABLE OF 1690.

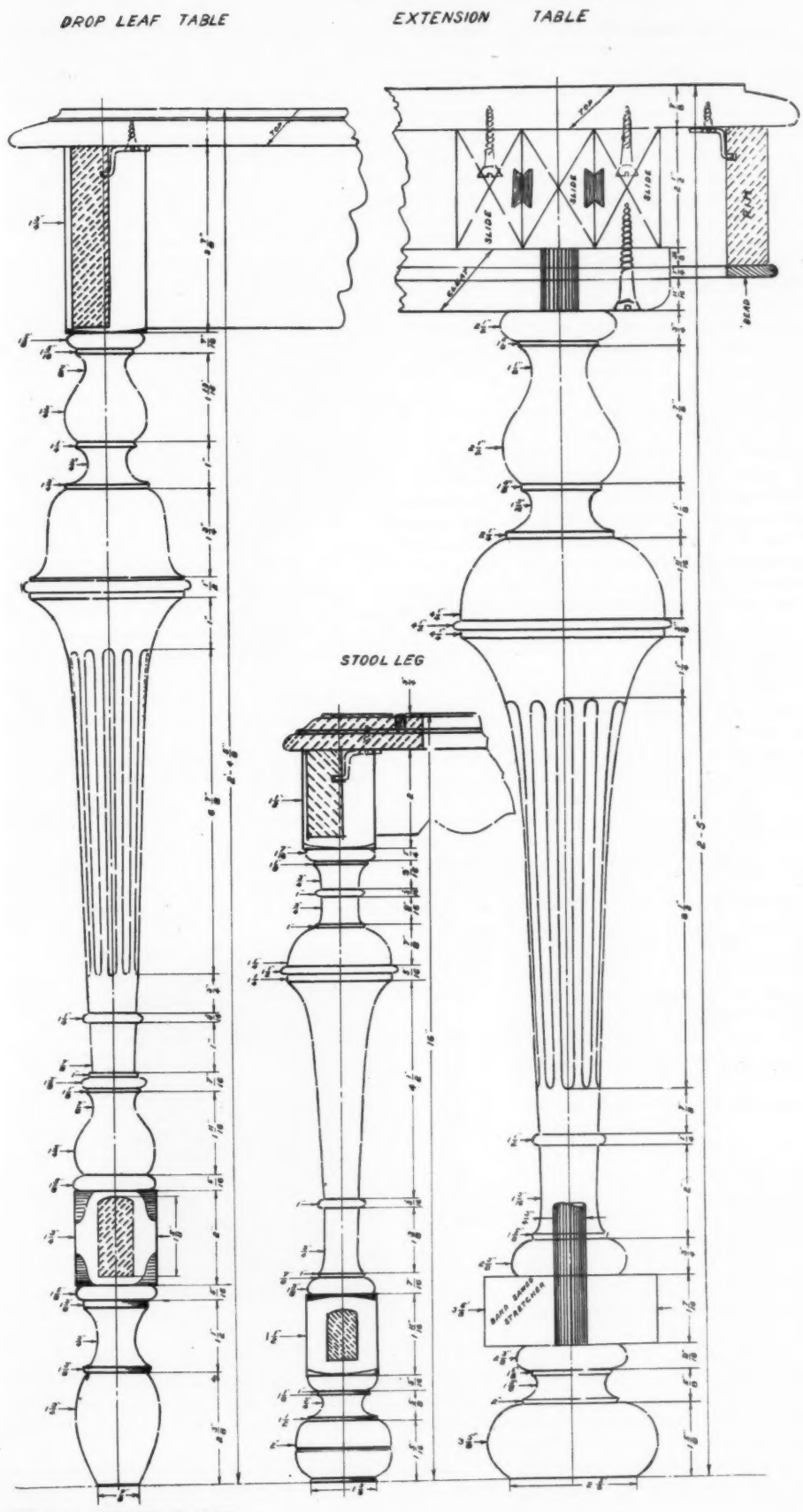
All of this augurs well for the future of the work as far as the objectives of the teachers are concerned.

It was with the idea of elevating the work of the instructors to a higher plane that the accompanying plate was drawn. It shows very distinctly the modern interpretation of the well known William-and-Mary type of furniture.

The William-and-Mary period style is strictly an English development which appeared during the joint reign of William III, the Stadholder of the Dutch Republic, and his wife Mary, who was the daughter of King James. It was during their reign that the English Renaissance was in its infancy. The creations of the Dutch and English furniture designers and tradesmen reflected the trend



TYPICAL FORMS AND APPLICATIONS OF WILLIAM-AND-MARY



STYLE TO FURNITURE LEGS.

of the times and embodied in them the spirit or mode of living of the two nationalities.

Under the reign of Elizabeth all of the household furniture was of the gigantic, massive type which when once placed, "stayed put." It was of the type which featured architectural facades of all sorts carved in the backs of the benches and chairs. With William and Mary came a longing for lighter pieces which would be serviceable to all. The houses were discarding their barnlike appearance. The ladies in the homes were catered to and the pieces were designed to suit their tastes.

The accompanying illustration is the sketch of a table constructed about the year 1690. It is typical of the William-and-Mary period Very little imagination is necessary to see the connection between the modern interpretation and the original piece. The lines are simple, delicate, and refined. The most prominent characteristics of the period are the following:

The inverted cup.

The O-Gee curve on the apron.

The bun feet.

The curved character of the under framing.

The drop form of trimming to harmonize with the inverted cup.

The legs always straight and turned.

In the accompanying plate the type is applied to seven different pieces. The first is the drawing of a living room table, giving exact measurements and

proportions. It shows the complete establishment of the so-called double top system. First there is the table top, showing shape or moulded edges; second, there is the under-top frame, also shaped, corners mitered and doweled together which gives added strength and improves the appearance of the completed article.

This top under-frame is screwed to the rails of the table, adding materially to the stability of the entire piece of work. The top is fastened to the under-frame by using screws as indicated in the drawing. The rails under the frame are moulded also, this being an added feature of this type of furniture. Near the bottom of the leg where the square part is indicated, is shown a shaped bottom shelf or rail which may be straight or bandsawed. Two end stretchers and a bandsawed center shelf may be used if desired in place of the curved under-framing for they fit in very well. The fluting which appears under the inverted cup is a very distinguishing feature of the William-and-Mary period. Casters or commercial slides may be used to advantage. If casters are used, the drawing of the leg should be shortened in order that the top may not be brought too high from the floor. The drawing is made to accommodate slides only and nothing higher.

The second drawing is that of a buffet leg. Here it was necessary to break the length on account of a lack of space, but the measurements and the drawing otherwise are complete in every detail. The applying of the frame structure to the leg has been omitted because the methods possible are so varied. If the double top system is used here it will add much to the beauty and stability of the piece. Fluting may be used if desired.

The drop-leaf or living room table is shown next. This is somewhat different from the two previous ones. The type of leg featured here is known in the industry and on the furniture market as of the bell type. This is classed as the most beautiful example of the William-and-Mary type. Its lines are very graceful and aristocratic. As a simple living room table it is complete in every detail from the top to the bottom. It depends on its own lines and workmanship for beauty and on the beauty of the grain for its finish. Mahogany or walnut should always be used for this type of furniture, if it is available. Mahogany is preferable because of its lightness and warmth. The shape of the top will necessarily be altered if drop-leaves are to be used. The commercial methods of holding the top to the rails is used, which allows the top to expand and contract at will. Mouldings may be added to the rails if desired. Full dimensions are given for both the thickness and height. The corners of the square part of the leg near the bottom have been broken off in an ogee shape. This is common to this particular type of leg.

The next drawing is that of a bedroom stool leg, with the corner drawn in full, showing its application. This leg is designed for a bedroom stool, but the features of it may be changed in proportion and applied to a living room, hall, fireplace, or any stool, where the spirit of this type may be used to advantage. The cane seat is preferable where the William-and-Mary design is used, but the apron curve may be changed and the stool upholstered. Fluting is in order if the maker so desires.

The next drawing is that of an extension dining room table leg. A complete corner of the table is given, showing an end view of slides and how they are applied; also, how the under-frame is fastened to the slides by means of a cleat or frame, which is first glued to the legs and under-framing and in return screwed to the slides. The bandsawed stretcher is a very particular feature of this type of table. It will be noticed that this stretcher separates the leg and the foot in this case. A $\frac{5}{8}$" tenon is turned on the foot. This passes through the stretcher up into the leg, a method which is much safer and more practical than the loose dowel method. Commercial fasteners are again used to hold the top to the frame. A bead is applied to the under side of the rails or rims. This table may be made in circular or oblong form, but in either case it receives the same under-frame and leg construction because an independent outer leg is needed in both cases. All necessary dimensions are given.

The drawing of a dining room chair leg comes next. The seat is of the slip seat type. It is made of common wood, webbed and covered all over with some desirable material. This slips down into place and is fastened permanently by means of screws through the corner braces. The fluting is optional. Steel slides are used on the feet.

The last drawing is that of a fernery leg. Here again the bell type of leg is used. A complete corner is drawn so that the proper application of the leg may be seen readily. It will be noticed that straight stretchers are used at the bottom to give added strength to the legs. The commercial carvings may be applied as shown, but they are not necessary. All dimensions are given and it should be an easy matter for any beginner to draw a complete fernery without any additional instruction.

From the foregoing treatise of the various applications of William-and-Mary design it may readily be seen how adaptable it is to modern American household furniture and how it lends itself to modern manufacturing processes. It is not uncommon for an automatic turning lathe to produce these legs by the thousands and automatic sanding machines to clean them up as quickly as they are turned.

ART CLAY WORK

Wayne M. Judy, Iowa City, Ia.

For those in the manual arts work who occasionally care to deviate from the conventional and do something that is slightly different, the work in art clay offers an interesting diversion. All sorts of methods of using materials have been arbitrarily placed in the category of art and art clay or Persian clay work is simply another

FIGURE 1.

way of decorating the products of the shop in order to make them attractive. During these days when the cry of economy is constantly being raised, this type of art can well be investigated.

In the first place, art clay work is not expensive. Cheap lumber can be used as a basis for the projects.

Rough fir lumber serves as well as any. In the second place, the work is not difficult, comparatively speaking. Seventh and eighth grade pupils can produce projects that are quite attractive as well as useful.

Picture frames, candlesticks, and lamps seem to be the problems most adaptable from experience thus far with the work. In making a picture frame, three-ply veneer is used for the back, or plaque, on which the picture is glued. The veneer can be cut out in some suitable design. Ordinary reed or a small dowel rod is then nailed in place, with

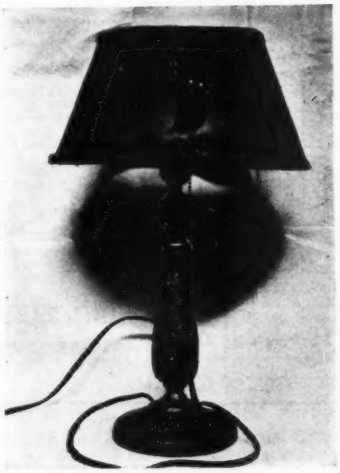


FIGURE 2.

small brads to serve as a border for the picture. Pictures can often be found in magazines, which look quite as well as expensive prints. The pictures can be given a coat of wax to make them glossy and to harden the surface. After this is done, the clay is applied with a cheap brush. A thick coat is brushed on, and care is taken not to get any clay on the picture. A smaller brush may be used when working close to the print. Shortly after applying, the clay will begin to harden, and it can then be roughened or stippled with the brush, by vertical strokes of "jabs" perpendicular to the surface. When the surface has been stippled uniformly, it is allowed to dry for at least four hours. When dry, rough spots on the surface can be sandpapered to produce the desired smoothness.

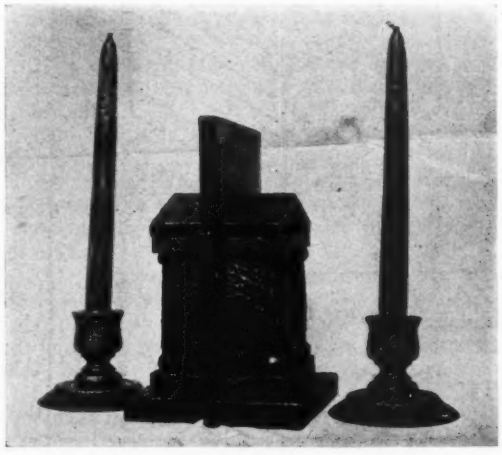


FIGURE 3.

The color is then applied with a small brush. Oil paints mixed with turpentine are used. The colors chosen should harmonize with the colors of the picture. When the color has been on for two or three minutes, it is lightly rubbed off with a bit of waste or cheesecloth. If variety in color is desired, a second and a third color can then be applied, and in turn rubbed off to produce harmonious effects. An antique effect can be produced when the color has dried, by rubbing with rotten stone.

Book ends, candlesticks, or any other work may be decorated in a similar manner. The pictures show some of the projects made in the shop. The cost of one of the pictures is approximately $2.40; the cost of a pair of book ends is $1.05, and the other objects in proportion.

CARRYING OUT IDEAS

C. M. Litteljohn, Seattle, Wash.

Once the fundamental mechanics of typography are mastered in the classroom, the larger uses of type faces and points for present-day advertising purposes may be inculcated in the minds of the students.

Carrying out ideas through type, the use of different faces and various points for each process, is valuable training for the student. The new and novel twists which may be fulfilled by careful selection of proper points to corroborate the theme are also valuable for stimulating the creative faculties of the student, and giving actual demonstration of how type is the handmaiden of merchandising ideas.

Take the following excerpt from a recent advertisement which shows typographically the abstract, as well as the concrete idea, of growth:

GROWTH!

1920—93,341
1921—101,918
1922—106,061
1923—113,748
1924—123,039
1925—128,502
August 1926—146,653

SCHOOL SAVINGS AS ILLUSTRATED IN COMPARATIVE TYPE SIZES.

Through the use of progressively larger point type the single word "growth" is seen to grow visibly. The idea is further developed as the numerals starting with small type in 1920 are brought up gradually to the larger point in 1926 showing as a ladder, or in perspective, the gains and strides made, as the numbers grow.

An ordinary type face has been utilized, and yet the idea is striking with the use of a simple arrangement. This may be termed a central idea in typography, inasmuch as it can be applied indefinitely to many subjects where comparative enlargement is to be demonstrated.

A SHEET METAL NUT BOWL

J. W. Bollinger, Theodore Roosevelt Jr. High School, Tulsa, Okla.

The Christmas season is a time when nuts and fruits and candies are plentiful, so that a nut bowl is a welcome sight under a holiday tree or on a loaded table.

A nut bowl can be just as readily made of sheet metal as of wood. The design shown is simple and easily made, is inexpensive, and lends itself readily to ornamentation.

It consists of three pieces of metal held together by a rivet in the center, and a wire around the edge.

This procedure is recommended:

1. Choose a design, make a paper pattern of the end, and lay out and cut the three pieces.

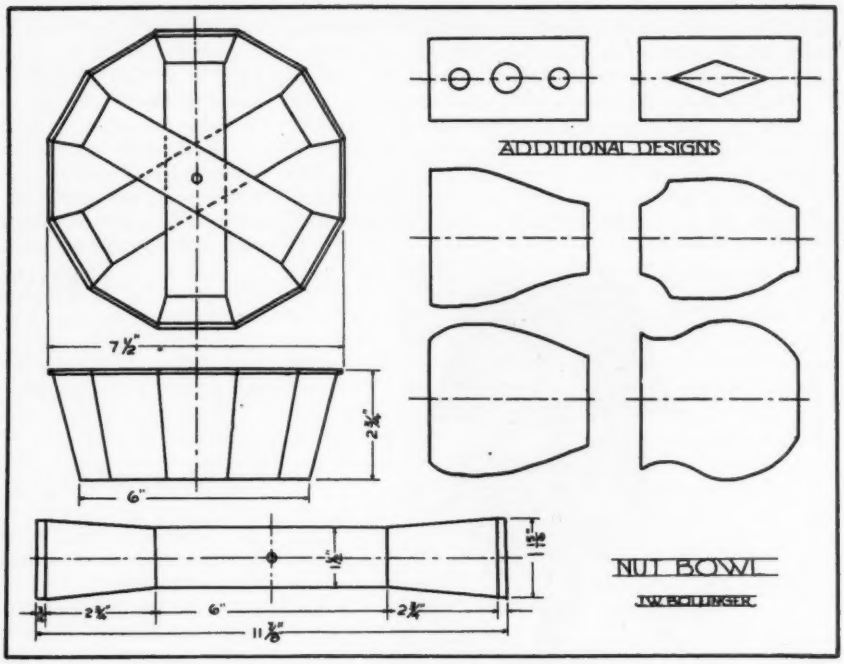
2. Punch or drill the hole in the center; bend over the edges for the wired edge.

3. Bend up the ends, and rivet the three pieces together.

4. Draw a circle having a 7½" diameter on a piece of paper, and divide it into a regular duodecagon or twelve-sided figure. Each side will be found to be 1$\frac{13}{16}$" long.

5. Cut a piece of No. 13 gauge wire, 23¼" long, and mark it off into sections 1$\frac{13}{16}$" long. Since the ends of the wire are to be joined together under the metal forming the wired edge, begin by making the first mark 1" from one end. Then make the other divisions of the required length, which will leave the other end $\frac{13}{16}$" long.

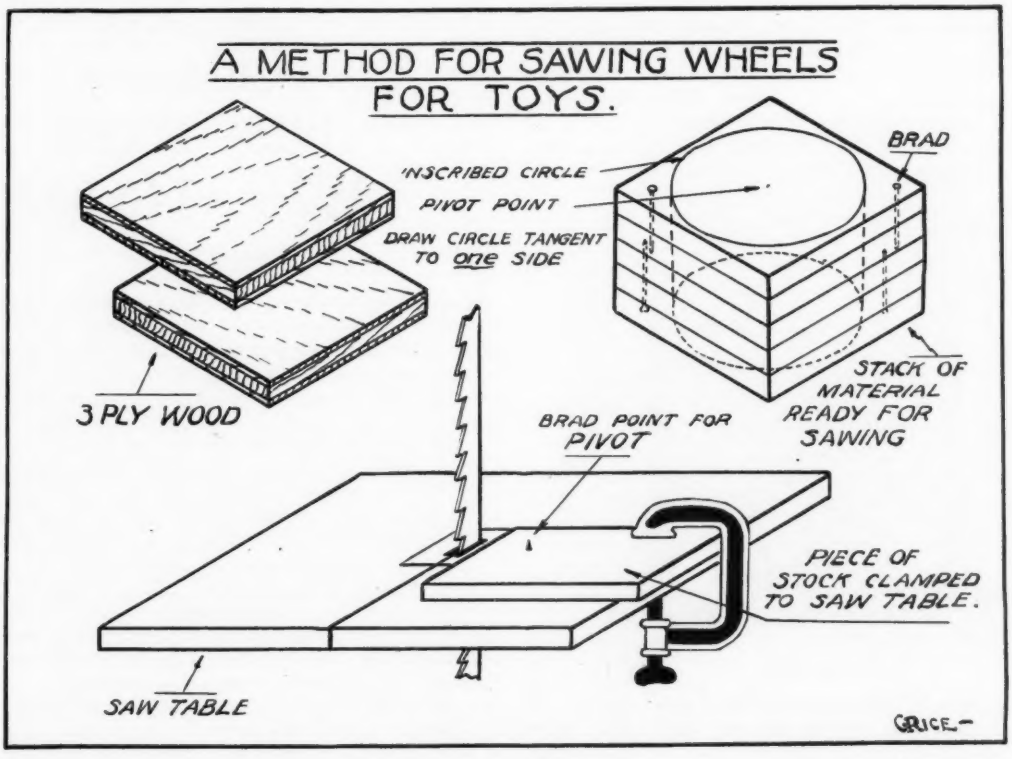
6. Bend the wire to shape carefully, and put it in place with a wiring machine. Sweat a drop of solder into the wired edge where the ends of the wire come together. Place the bowl over the drawing of the figure, and bend to shape with the hands.



DETAILS OF NUT BOWL.

7. Finish the whole problem with two coats of enamel, using colors such as green and red, in harmony with the season. Brown is also a good color.

8. Have someone at home make a lining for the basket out of suitable material, such as heavy crash or heavy burlap. This can be sewed onto the exposed sections of the wire.



A METHOD FOR SAWING WHEELS FOR TOYS

Charles Rice, North Junior High School, Everett, Wash.

The illustration accompanying this article describes a method of sawing a number of circular pieces with speed and accuracy. This jig will be useful for sawing wheels for toys, and forms for fibre weaving.

If the wheels are made from wood, the stock is sawed up to form squares. The square pieces should have greater width than the diameter of the wheels. A number of the pieces are stacked up and fastened at the corners with brads. A circle is inscribed on the upper square of the stack. The circumference should meet one of the sides of the square in order to provide a starting point for the saw.

A piece of wood with the point of a brad projecting from the surface is clamped to the table of the band saw to form the jig.

The stack is inverted and pressed down upon the jig with the center of the circle on the brad point. By turning the stack a set of perfect wheels is sawed out.

BOOK RACK

A. E. Gray, Stockbridge, Mass.

(See Supplement No. 40)

While the photograph accompanying this perhaps is fully adequate to give the reader a clear conception of the little woodworking project, yet a few suggestions may not be amiss.

This project is an admirable one for any grade, ranging from the sixth grade up, for the various treatments permissible both in its construction and finish allow for a wide range of skill and ability. The author has seen young students and mature men delight and profit in its construction.

For young students, a simple butt joint assembly is used, fastened with glue and brads or screws. For more advanced students the use of either the mortise and tenon or dowel joint should be used.

In assembling, glue or brad the two pieces forming the "trough" first. If a rabbet plane is available, a rabbet should be planed along the lower edge of the wider piece, ¼" wide and ½" deep for this assembly.

This project will afford a great variety of tool manipulation and can be made of any suitable cabinet wood at hand. Likewise the finish is optional. Stain, filler, shellac, and wax has given good results in the author's classes.

Another good feature is that this book rack will permit initiative and originality in designing the ends and the students should be permitted and encouraged to draw their own design.

Here are a few suggestive finish schemes that may add interest to its construction and attractiveness to the finished piece:

(1) Finish in the ordinary way, with shellac, wax or varnish, or

(2) Finish in polychrome. (If the instructor is not acquainted with this finish an inquiry to this magazine with stamped, addressed envelope will no doubt obtain the information.)

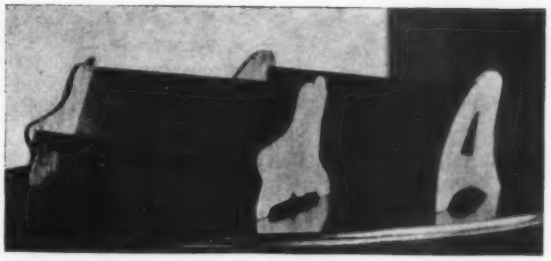
(3) A design made with the use of "gesso" or some other modeling clay which can be had in pleasing colors.

(4) Simple carving on the ends. A boy's common jack knife will do the work if carving tools are not available.

(5) End designs worked by perforation, using coping or compass saw.

(6) Two tone effect. This can be obtained by cutting around a simple center design and applying a thin coat of shellac to it before staining. Or another kind of wood can be inlaid instead for this effect.

(7) For a boy's den or room the use of non-gloss paint and attractive transfers in harmonizing colors.



TYPICAL BOOK RACKS MADE BY MR. GRAY'S STUDENTS.

These transfers can be secured from any good paint store or through any mail order house handling them.

Finally, this project is a very practical one, occupies very little space yet can accommodate a dozen books or so and the cost is small. If made with screw assembly it can be taken apart and packed in trunk or box for use while on vacations or away from home.

A MACHINIST APPRENTICESHIP SYSTEM AT JACKSON, MICHIGAN

Charles A. Wardner, Director Vocational Education

The class for apprentices at Jackson was established in connection with the part-time school in February, 1923. The boys spend five full days per week in the factory shops, learning the trade under factory conditions. On Saturdays the boys come to the school for the academic work and are paid by their employers for the time in school. Most of the apprentices have enrolled in a mechanical engineering course with a correspondence school. The instructor helps them over difficult places and the school hours give them time in which to prepare the work sent in.

Jackson is now building a new million-dollar high school to be completed in February, 1927. In this school it is planned to teach trades on the co-operative system by alternating one week in school and the next in the industry. Under this system two boys hold one job.

In anticipation of the opening of the high school, we have succeeded in getting the local employers' association to appoint an apprenticeship committee of five factory managers to help work out satisfactory plans. The committee has adopted the apprenticeship plan as organized by the National Metal Trades Association and has aroused considerable enthusiasm over the system among both the young people and the factory managers.

During the past year there were sixteen machinist apprentices in the class in the part-time school. The apprenticeship committee has succeeded in raising this number to about thirty at the present time and believes it can increase the number to 75 by the time the high school is ready. This will mean double that number of students under the co-operative plan of alternate weeks.

We have worked out a schedule and are arranging for outside speakers to give talks each week on some phase of shop work. The speakers, for the most part, will be shop men and specialists in different departments. At intervals of two or three months the employers' association will give a dinner to the apprentices. During the evening special talks will be given them.

When the students have completed the apprenticeship course, each one will be given a pocket size leather folder with his name embossed in gold on the outside. On the inside will be his photograph with his signature and the school seal, also his personal description. On the next page will be his school record, his shop record, and a statement signed by both the school authorities and the factory manager.

We feel that we are headed in the right direction and that the apprenticeship system will prove a valuable part of the vocational education plan.

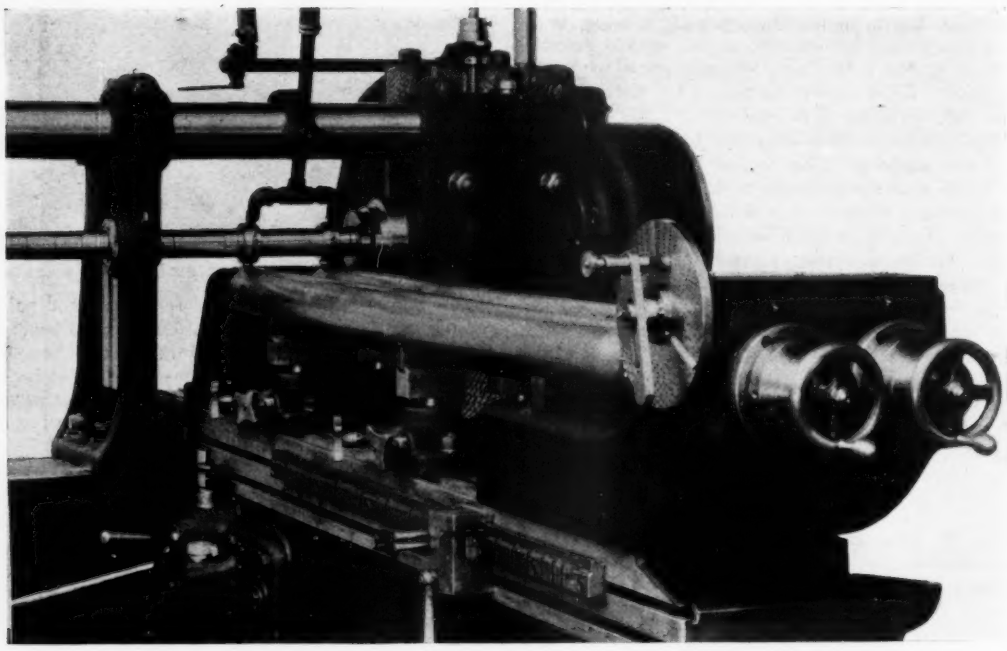


FIGURE 11. MILLING A NUMBER OF SLOTS ON THE PERIPHERY OF STEEL PLUNGES.
MACHINE: 48" Automatic removing stock from solid. PART: Plunger. CUTTERS: 2—4" diameter special slotting cutters on 1⅛" diameter arbors No. 104, with special collars. OPERATION: Mill slots. MATERIAL: Machine steel. TIME PER PIECE: 38.60 minutes. FEED: 7.11.

How Shall We Mill It?

Typical Ways of Handling Various Milling Jobs—Conclusion

Howard Rowland

11. SPECIAL FIXTURES

There are many illustrations which might be given to show how a standard machine is used to handle a job through the assistance of special work-holding devices. The operation shown in Figure 11 is that of milling a number of slots on the periphery of steel plunges. Each one of the slots is of a different length. A special two-spindle index fixture mounted on the machine table holds two pieces. The work is supported in adjustable half bearings spaced approximately 15" apart and is held between centers, the end location being taken from the centers at the end which approaches the cutters first. The centers at the other end are adjustable by means of a hand wheel. This arrangement determines an accurate end location of the work.

The indexing arrangement consists of an accurate two-spindle index head in which adjustable centers are incorporated, the indexing from the head to the work being through a pair of dogs and drivers.

The arrangement for milling the grooves to different lengths consists of a table-feed trip dog mounted in one tee-slot on the side of the table and a special index bar or table return dog mounted in the other tee-slot on the side of the table. The return dog is located by a plunger which engages one of the index slots. The operator can slide the dog to the next index slot where the grip is

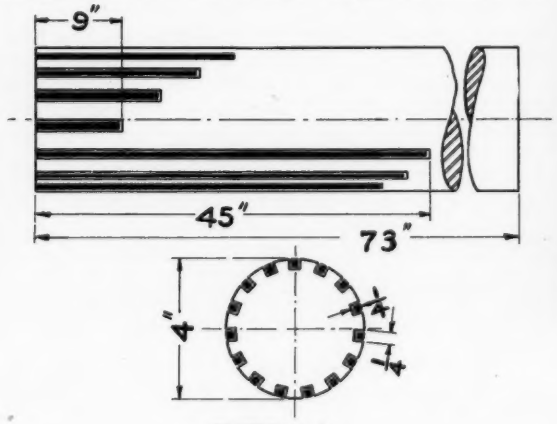


FIGURE 11 A.

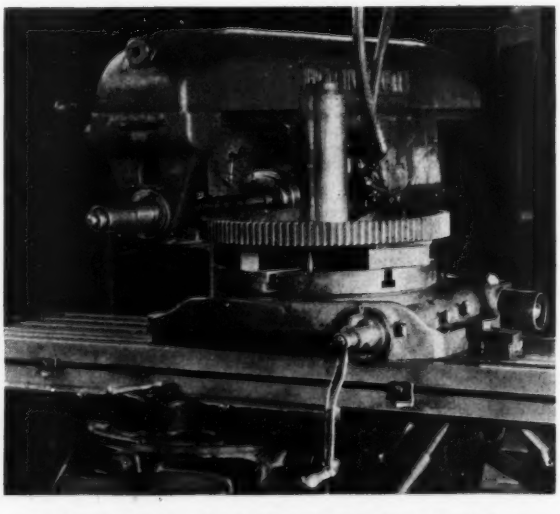


FIGURE 12. CUTTING A SPUR GEAR WITH A CIRCULAR MILLING ATTACHMENT.
MACHINE: No. 4 Universal H.P. removing stock from solid. PART: Gear. CUTTERS: 1" diameter 3 pitch gear. OPERATION: Mill teeth. SPEED: 52 R.P.M. MATERIAL: Cast iron. TIME PER PIECE: 55 minutes. FEED: 4¼".

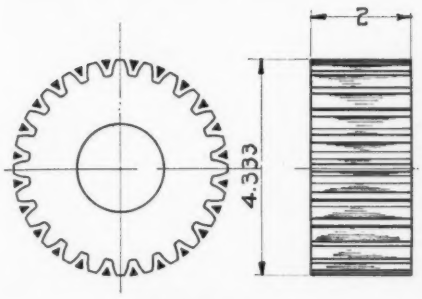
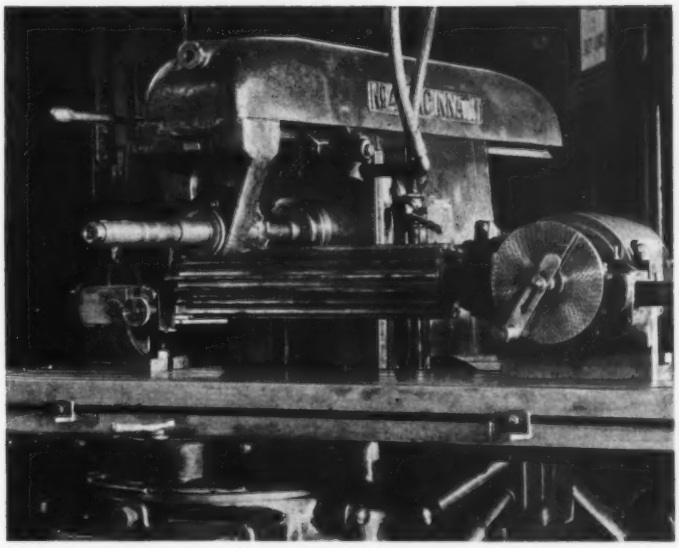


FIGURE 13 A.



(RIGHT) FIGURE 13. CUTTING SIX LARGE SPUR GEARS.

MACHINE: 4 Universal H.P. removing stock from solid. PART: Pinion. CUTTERS: 1—4" diameter 6 pitch gear cutter. OPERATION: Mill teeth. MATERIAL: Cast iron. SPEED: 80 R.P.M. TIME PER PIECE: 11 minutes. FEED: 5%.

released. The plunger seats itself in the slot, thus determining the proper length of slot to be milled in the work. This job could have been handled in a much simpler way, but at a sacrifice of time and cost.

12. MILLING WITH ATTACHMENTS

Standard milling machines can usually be supplied with standard *attachments* such as vertical attachments, circular milling attachments, and slotting attachments.

In Figure 12 the use of a circular milling attachment may be seen. Here a railroad shop is cutting a spur gear by mounting the gear on raising blocks directly on the circular milling attachment table. The vertical feed is used and after each tooth is cut, the gear is indexed the proper amount. This reading is taken from the dial on the crank shown in the foreground.

Another example of the use of the standard attachment is shown in Figure 13. Here six large spur gears are being cut. The indexing is taken care of by the standard universal dividing head.

The final illustration, Figure 14, shows another use of an attachment. The operation is that of cutting a keyway in a shaft. After the keyway has been cut to length with the cutter shown on the main arbor of the machine, the table is lowered so that work will clear this cutter; the small vertical cutter is lowered and used to mill the end of the slot out round. This permits the insertion of a driving key having a round end in the milled slot of the work.

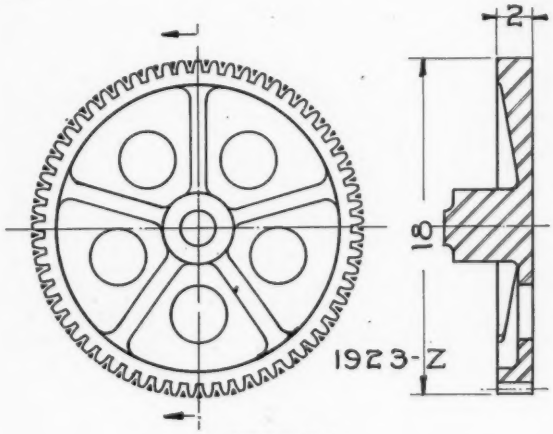


FIGURE 12 A.

PICKING THE RIGHT METHOD

Most manufacturers today have established a service department and are able to render a real service to the users of their products both in the way of recommending the right *machine* for the particular job and also the right *method*. The purchase of a milling machine solves only part of the problem. Satisfactory results can come only from the right machine and properly designed fixtures and cutters. The right machine whether of the automatic manufacturing type, or the knee and column type, should be determined by the quality of parts manufactured per

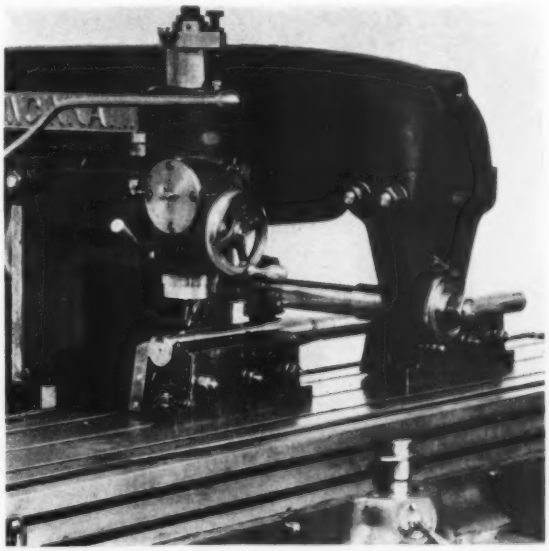


FIGURE 14. CUTTING A KEYWAY ON A SHAFT. MACHINE: No. 5 Pl. Hi. Power Mill. PART: Shaft. CUTTERS: Spiral end mill and vertical spindle slotting cutter on horizontal arbor. OPERATION: Mill spline and round out end. MATERIAL: Anything. TIME PER PIECE: Unknown. FEED: Unknown.

FIGURE 14 A.

lot and per year. These same conditions must cover the design and the special attachments of fixtures employed.

There is no economy in using any but properly designed cutters for the job in question. For this reason the various service departments are ready to help the manufacturer select the *right* machine and equipment with the most economical fixtures and properly designed cutters.

THE SCHOOL CRAFTS CLUB MEETING

The first fall meeting of the School Crafts Club was held at the Geneva Restaurant, New York City, on Saturday evening, Oct. 16th. The School Crafts Club has found the dinner meetings to be a most satisfactory means of getting a good turn out. Where is the man who does not appreciate a beef steak dinner? Business was transacted to the extent of nominating, electing, and installing officers for the coming year.

The retiring President, Mr. Charles H. Kennington, Newark, N. J., made this proposal to the membership as a new year is started:

To pass on your suggestions to the new President.
To do your share by attending meetings.
To get a new member.
To be an active member.
To pay your dues to the Treasurer.
To give your new address to the Secretary.
To contribute to the exhibit by bringing in your project.
To boost the School Crafts Club.

THOMAS DARLING,
New York, N. Y.
President-Elect of the School Crafts Club,
New York, N. Y.

The subject "Composite Shop Work" was discussed by Mr. Arthur L. Perry, Director of Industrial Arts, Rahway, N. J. Mr. Perry brought out that there is a difference between the terms diversified shop and composite shopwork. According to his analysis, the diversified shop is one in which the instructor handles two or more activities at the same time and in the same shop, by dividing his class into groups. On the other hand with composite shopwork, the instructor establishes units of this or that type of work. For instance, during the first ten weeks of a term a whole class may make a study and construct projects in concrete and do nothing else.

Both types are workable. A great deal depends on the instructor as to which type is the most successful. Mr. Perry is partial to the composite shop idea and uses that type in the Rahway industrial arts work. With the composite shop work it is possible to prepare and organize the lessons, and at the end of a unit of ten weeks, the class has accomplished something tangible. Rahway is sold to industrial arts exhibits and thousands of people visit the display on the nights of exhibit week in the late spring.

Mr. Perry sets up for junior high industrial arts objectives the aims of try-out, self discovery, and industrial appreciation, with the appreciation value as the most important. Appreciation makes for an intelligent consumer.

Many teachers of shopwork have wondered if the spraying process in wood finishing is adaptable to school shop work. Mr. C. J. Thomas, instructor in Public School 188-B, New York City, demonstrated and explained his method in the finishing of toys in conjunction with brush work and dipping. Mr. Thomas has the toy work well organized, and each pupil keeps his tracings, toy parts, and patterns in an envelope which is filed until the next lesson. The pupil makes his own tracing paper by rubbing a few drops of sperm oil over bond paper. The priming coat of finish is applied by dipping the toys consecutively in three pans: (1) hot water to open the wood pores; (2) rabbit skin glue size; and (3) Danish whiting, rabbit skin glue and hot water paint. The toys dry hard in fifteen minutes. The third dipping may be colored by adding dry ground colors. A heavy drawing pencil is used to sketch lines on the animals. Wheels for toys are cut with a plumber's washer cutter.

Mr. Thomas uses shellac in the spraying of toys. The apparatus consists of a three-cycle hand pump, air tank, hose, and a universal sprayer. The boys line up for their turn at spraying with each lad spraying and pumping in turn.

The officers of the Club for the year are:

Thomas Darling, president, The Bronx, New York City; Russell F. Hemion, vice-president, Paterson, N. J.; Lloyd F. Stair, treasurer, Madison, N. J.; Arthur F. Hopper, secretary, Plainfield, N. J.; Julius Eisenstein, financial secretary, New York City.

Committee Chairmen: Samuel L. Tanenbaum, Program; L. O. Asher, Publicity; David Petrie, Membership; John Mulholland, Entertainment. —L. F. Stair.

THE CHICAGO INDUSTRIAL-ARTS ROUND TABLE

The Industrial-Arts Round Table of Chicago opened its 1926-1927 season on October 15th, with an attendance of sixty members.

Mr. D. W. Castle opened the meeting with the reading of a list of topics for discussion. The topics included the following: Organization of instructional material; devices and methods for maintaining evening school attendance; tests and measurements in industrial arts; general versus specialized industrial training; safety problems in school and home; budget systems for supplies; attitudes to be developed toward distasteful work; essential factors in shop work; attitude of the employer toward the manually trained boy; new phases of industrial arts.

Mr. R. L. Marshall who presented the subject, "The Teaching Load," declared that there is a wide variation in industrial arts classes. The number of pupils to a teacher was formerly sixteen, but there is now a tendency to increase it to 20, 24, or even more. There still obtains a practice of sending "problem" cases to the handwork classes, but lately the use of new material has afforded the teacher some relief with this type of pupil.

Mr. Marshall pointed out that an overcrowded school frequently has a larger number in drawing and shop classes than can be properly handled. There is need, he said, for a method of determining the ideal number of pupils for the various subjects in the industrial arts program.

Mr. Beeman, of Harvey, Ill., presented a mechanical drawing questionnaire, in which this problem is considered. A specific answer is not available at present but a rough estimate is that not more than 25 pupils may be effectively taught in a mechanical drawing class. Mr. J. F. Kolb held that where large classes are the rule, the tendency is to copy from a book and mistakes are often overlooked by the teacher. Again, he pointed out, classwork changes from large, worth-while projects to exercises with no industrial meaning.

Mr. Fritsch of Gary, Ind., believed the situation might be saved through the enthusiasm and personality of aggressive, interested teachers. Mr. L. W. Wahlstrom pointed out that industrial arts is not a book subject and the boy's interest should be maintained in all the work.

Mr. N. F. Fultz, of Cicero, closed the discussion by emphasizing the need of presenting detailed, all-inclusive costs of industrial work to avoid embarrassment to the teaching faculty where the cost item is brought up. It is true that up to the completion of the high school course, the per capita cost in academic subjects is less than the cost of shop subjects, but after the high school there follows four years of college, and after that frequently a graduate course. His contention is that if the community or the state is willing to spend so much on the education of the professional man, it should be equally as willing to spend an adequate amount for the training of the mechanic. He showed the necessity of small classes in view of the relatively small number taking technical subjects and the need for constant checking and correction of the pupil's shop efforts.—R. B. Bagby.

A Vocational Program. The State Board of Vocational Education of Texas has outlined a vocational education program for the state, which is as follows: Incorporation of vocational work in the high schools; enactment of part-time school legislation; part-time instruction required for boys and girls of school age who must work; vocational night schools for adults who desire further training, and adequate financial support for vocational education.

VOCATIONAL EDUCATION SOCIETY OF BOSTON

The Vocational Education Society of Boston held its first meeting of the school year Saturday, October 9, at 12:30 P. M., in the Hotel Westminster at Copley Square. President Robert E. Baker presided, and extended "New Year's" greetings to the membership.

The speaker of the day was Mr. Leonard M. Patton, master of the Edward Everett district, Boston. His subject was "Character Education."

Mr. Patton pointed out that the fourteen-year-old of today possesses a greater worldly knowledge than the adult of a half century ago. In the fields of science, mechanics, and material things, today's child lives in a new world. But it is not such a well-balanced world as the world of yesterday; for the moral and religious sides of life have lagged behind the material. We have a well-equipped ship, but no rudder.

Unless our boys and girls are trained to discern right from wrong, to become tolerant and social-minded, to love work for the work's sake, to serve as well as to lead, to follow ideals—civilization will decay.

The modern home has failed to give the proper training to restore this balance. The church reaches comparatively few, and reaches them meagerly.

At the conclusion of his talk, Mr. Patton answered a number of questions from the members. President Baker asked for suggestions as to meeting place, speakers, and trips for the meetings of the coming year, and reported progress on the roster of members which is in preparation.—Frederick Ames Coates.

MR. NICHOLS AT SAN JOSE

Mr. A. R. Nichols, formerly of the Oregon Agricultural College, Corvallis, has taken up his work as director of vocational education at San Jose, California.

Mr. Nichols began his teaching career as principal of a school in Iowa. Later he taught manual training at South Omaha, Neb., and from there he went to Corvallis,

A. R. NICHOLS,
Director Vocational Education,
San Jose, Calif.

Ore., as principal of the high school. Upon leaving this position, he became a critic teacher at the Oregon Agricultural College, and later was appointed state supervisor of trade and industrial education and head of the industrial education department of the Agricultural College. During this time he also acted as director of city vocational work at Portland. He resigned last June to accept the position of director of vocational education at San Jose.

THE USE OF WOODWORKING MACHINERY

The Cincinnati schools, through the office of Mr. E. W. Christy, director of industrial arts, have for several years enforced strict rules concerning the use of power machinery in the woodworking shops. These rules have been particularly successful and since their enforcement have eliminated all major accidents. The rules read as follows:

1. Students may be permitted to use a **band saw, planer, lathe, sander, mortiser, and grinder** only after they have had careful instructions as to their proper use, a practical demonstration of the safe way of operating them, and have obtained **permission each time such use is desired.**

2. Students may be permitted to use a **hand-jointer** and a **circular saw** only after they have had **individual** instruction. Thereafter **permission** to **operate** either of these machines must be obtained **each time** from the instructor who will see that the machine is properly set and the guard in place.

3. Students may use woodworking machines only as members of a class or group under the immediate supervision of the instructor in charge. Students may be permitted to come to the shop for extra work outside of their regular class periods, but only on condition that they obtain permission of the instructor in charge of the room, become temporarily members of the class occupying the same, and submit themselves to the same supervision as the members of the regular class.

4. **Guards must be in working position at all times** with the following exceptions:

a. An **instructor** may temporarily remove a guard in order to sharpen knives or adjust a machine.

b. An **instructor** may also remove a guard to work, provided he substitutes another guard better adapted to the particular piece of work than the regular one.

5. Only one person shall be permitted at any machine at one time, unless the instructor assigns other persons as helpers.

6. Guards must not be prevented from returning to their normal position by any holding device which thwarts the purpose of such guards.

7. Competent instructors in the Industrial Arts Department, from other rooms and schools, may use the woodworking machines in the absence of the regular instructor, in accordance with these rules.

JOINTER. A piece of stock must be **not less than twelve inches long, one inch wide and one-quarter of an inch thick** to be worked on a jointer.

CIRCULAR SAW. A piece of stock must be at least **twelve inches long** to be ripped on a circular saw unless special jigs, meeting with the instructor's approval, are used.

A notched stick shall be used for pushing stock past the saw, unless the stock is of sufficient length to permit a helper to draw it through from the rear of the machine. In the latter case the helper must be assigned by the instructor.

A piece of stock should be at least **ten inches long** to be cross cut on a circular saw, the ten inch part, or greater length, to rest against the cross-cutting fence. For shorter pieces, special jigs, meeting with the instructor's approval, may be used.

The operator of a circular saw should not stand in line with the revolving blade.

BAND SAW. A piece of stock to be cut on a band saw should have a **flat, true surface,** resting on the saw table. This surface should be large enough to prevent the piece from turning over.

The saw guide shall, in all cases, be kept as near as possible to the top surface of the piece of stock.

PLANER. A piece of stock should be at least **twelve inches long** to be run through a thickness planer.

POWER GRINDER. Goggles should be worn when using a power-driven grinder.

PERSONAL NEWS NOTES

Mr. James A. Hoskins, of Waterloo, Ia., has resigned after a service of eight years, in order to complete his course and receive his degree at the Iowa State College, Ames, Ia.

Mr. George Draper has been appointed instructor in advanced woodwork in the Lincoln Junior High School, Medford, Mass., succeeding Mr. Dodge who took a high school position.

Mr. William Ashline teaches woodwork in the Fitchburg, Mass., high school.

Mr. Stanley Kruszna, of Scituate, Mass., teaches printing in the Lincoln and Hobbs schools at Medford, Mass.

Mr. Frederick Toupence teaches elementary sheet metal and electricity in the junior high schools at Medford, Mass.

Mr. H. C. Wilson has become director of industrial arts at Watertown, N. Y. Mr. Wilson has charge of the industrial courses, the domestic science courses, and the industrial arts courses in the high school and grade schools.

Mr. M. J. Sullivan has been appointed instructor in architectural drawing in the Essex County Boys' Vocational School, Newark, N. J.

Miss Clara H. Krauter has been appointed as principal of the Essex County Girls' Vocational School, Newark, N. J., to succeed Miss Griselda Ellis. Miss Krauter is a graduate of the Trenton Normal School and of Columbia University, and was formerly principal of the Atlantic City Vocational School.

Miss Ellis resigned after completing thirty-seven years' service as a teacher, all of which was spent in Newark. She leaves a school which bears to an unusual degree the impression of her personality. To her hands fell the important task of organizing a new undertaking at a time when neither educators nor industrial leaders accepted the theory of giving practical training under school conditions. Among the difficulties encountered were the lack of a definite, well thought-out course, adaptation of an antiquated building to new uses, and disinclination of principals to part with pupils who might be graduated and enter high school courses.

Mr. G. D. Deane has been appointed instructor in academic printing at the Essex County Boys' Vocational School, Newark, N. J. He is a graduate of the Oswego Normal School and has had five years of practical experience in the trade.

NOW, ARE THERE ANY QUESTIONS?

Finishing Jenesero

Q. 626. Will you inform me how I can apply a finish that will be most pleasing on a davenport table made of Jenesero? It does not need to match any other piece of furniture. The top has a beautiful striped figure.—R. H.

A.: This wood is not at all satisfactory as a cabinet wood because of its excessive softness and lack of strength, but it does take a good color in either the walnut or mahogany finishes.

A two ounce solution of either walnut or mahogany stain in a gallon of hot water is about right. Apply and let dry over night on wood which has been sponged, dried, and sanded with a 6-0 paper. Without sanding the stain coat, apply a sizing coat of orange shellac diluted one-half with denatured alcohol. Let dry three or five hours, sand with a split 6-0 paper, dust off, and fill with a heavy, brown silex filler. Clean off well, and dry 48 hours. Dust off and varnish with a well brushed out coat of good floor varnish. Dry three days, sand smooth and free of nibs with a split 6-0 paper; dust off, and revarnish. Dry three days, resand, revarnish. Dry one week and rub to finish with FFF pumice stone, crude oil, and a hard felt. Clean up with a good polish.—**Ralph G. Waring.**

Table Top Refinishing

Q. 635. Can you give me directions to follow in finishing an injured table top or for removing marks from the finish?

These are the facts: A walnut dining table was carefully wrapped (sheet against wood—then canvas—then excelsior), and stored over the summer. It is now covered with marks as if the cloth had stuck and pulled the varnish, though the marks are hardly discernible to the touch. There is also a mark made from a doily which had something sitting on it.

I tried 6-0 sandpaper and oil; rotten stone and oil, but didn't have much success. I thought I might soften the varnish and smooth by carefully wiping with a cloth moistened with alcohol, followed by rotten stone.—W. C. H.

A.: Wash the table with Ivory soap suds to remove all traces of the oil, then use a 6-0 "wet-or-dry" sand paper to rub down the table free of all cloth marks. Don't get the idea that rubbing work is easy—there are no soft jobs in honest-to-goodness finishing work. Wash and clean with chamois when through sanding, dry half a day, and apply a well flowed out coat of good floor varnish. Use a ball of burnt varnish on the end of a fine stick or wire to remove any dust specks which may have gotten into the varnish, which should be applied in a warm, dust-free room.

Let the varnish coat dry one week, water rub with FFF pumice stone and felt pad. Do not oil-rub table tops as this has a permanent softening effect on the varnish, which though not discernible to the eye, is easily noticed when covered with a table cloth and dishes. Water rubbing, on the other hand, has a definite hardening effect.

The table should not be used for one week after rubbing, in order to allow further hardening of the varnish.

Dining room tables should not be covered with pads and table cloths as a general thing, under the impression that this protects the table finish. A ten-year experiment under constant observation has shown me the fallacy of this popular notion. The table with which I have experimented is left exposed to the air at all times, with only a small center piece and plant, between services. Whenever possible, individual doily sets are given preference over the linen table cloth and pad. The result has been that the varnish has increased in beauty with time, and when occasionally polished is restored to full beauty of the finish. On the other hand, where the cloth and pad are persistently in use, the varnish undergoes a sweating process induced by the heat of the dishes, atmospheric moisture in the pads and the condensing effect of the cooler wood table. Due to lack of atmospheric circulation, this effect continues under the pad indefinitely with resulting deterioration of the finish.

Your suggestion of using a cloth and alcohol to soften the finish, would most certainly ruin it as this is a dangerous trick even in the hands of an experienced piano finisher accustomed to its use. Next time it is necessary to pack the table top away, face the table with a single sheet of heavy Kraft paper which can be purchased from any furniture store on occasion. This Kraft paper may then be backed up with a blanket and excelsior, in which case the table may be stored indefinitely without fear of printing.—**Ralph G. Waring.**

PROMOTING HOME MECHANICS

As a means of acquainting parents with the aim and scope of the "home mechanics" course in the junior high school at Bennington, Vermont, Mr. Leon A. Orr has sent out an explanatory letter in which repair work is solicited. The letter has produced a satisfactory response. It reads as follows:

One of the greatest justifications of manual training in the junior high school at the present time is the "handy man idea," in other words, so training the boy that he will be handy with his hands in as many ways as is possible in the time at our disposal.

To further this work in our school in Bennington we wish your cooperation to such an extent that you will aid in encouraging some of the projects listed below for your son to work upon. This will not only aid in broadening his handiwork ability, but will be of real benefit to his home.

We will endeavor not to allow anything beyond the boy's ability. We will supervise him while working when the work is done in school, and not allow him to start a project until suitably instructed and prepared.

We hope this will work out to the mutual advantage of all concerned and consequently become an important part of our instruction in manual training.

Projects suitable to meet these requirements:

I. Repair of furniture:
   a. Broken parts: Repairing or making new parts to replace the broken ones. Gluing up furniture that is apart.
   b. Re-upholstering: Placing new webbing; tying up and replacing broken springs; repacking and recovering with the old or new upholstery.
   c. Refinishing furniture: Varnishing and rubbing or painting. Removing old finish and refinishing.
   d. Chair-seats: Recaning cane seated chairs; placing new reed on porch chairs; placing composition seats on chairs.

II. Repairs about the home:
   Soldering broken or leaking pans.
   Replacing glass in windows and puttying.
   Repairing or making window screens.
   Repairing broken sash cords, sash fasteners, etc.
   Repair and hang window shades.
   Repairing broken umbrellas.
   Replacing washers on leaking faucets.
   Cleaning clogged traps in waste pipes.
   Repairing electric bells.
   Trim sticking doors or windows.
   Repair doors that will not lock.
   Drill holes in iron or steel.
   Simple forge work.
   Very simple automobile repair.
   Regulate gas burners.
   Read electric and gas meters.
   Sharpen kitchen knives and tools.
   Tighten and sharpen shears.
   Regulate (not sharpen) lawn mowers.

III. New construction work:
   Making simple projects of wood.
   Making of tin cups, scoops, etc., from emptied tin cans.
   Simple cement work.

The only expense to the boy or his parents for this project work is the actual cost of material used, which, in most cases, is very slight.

We have presented quite a list of projects, yet it is not at all inclusive. Many other things may come to your mind to have done. If you think it is within the ability of your son, we will appreciate it if you will, through him, communicate with us.

We also are ready to lend our tools to responsible students for over night or week-end work, but expect proper care to be taken of them.

Mr. Paul W. Chapman has been appointed state director of vocational education for Georgia.

Mr. M. M. Walter, formerly director of vocational education at Bethlehem, Pa., has joined the faculty of the School of Education at the Pennsylvania State College as Associate Professor of Industrial Education. Mr. Walter will be associated with Dr. F. T. Struck in the department of industrial education, where his knowledge of trade and industrial education, and especially industrial arts, will be a distinct asset to him. He is a graduate of Bucknell University and holds a degree given by Temple University.

Don't overlook this important feature when buying planes

Stanley planes with steel bases reduce breakage

MANY school shops have concrete or hard composition floors. With such floors, breakage of cast iron planes is sometimes unavoidable. Stanley planes with wrought steel bases obviate this difficulty.

This new plane is identical with the Stanley Bailey cast iron plane in every important feature of manufacture and adjustment.

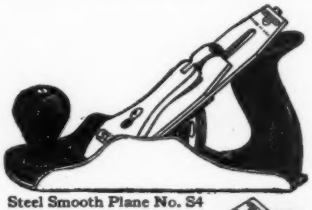
The plane with the steel base is also lighter, an important feature to consider when selecting planes for smaller boys.

The Stanley Steel Plane is of the same high quality that has made the Stanley the favorite of carpenters for over half a century. You can examine and test this plane at almost any hardware store.

The Stanley Catalogue No. 34 should be in the hands of every Manual Arts or Vocational Supervisor or Instructor. It lists and shows pictures of over 1500 items, as well as detailed drawings of their construction and adjustment. In addition, the appendix gives a number of tables covering subjects pertinent to wood-working.

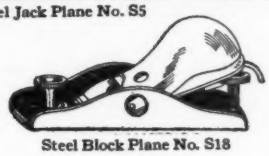
You should have a copy of Catalogue No. 34-G by all means. Send for yours today.

THE STANLEY RULE AND LEVEL PLANT
Educational Department, New Britain, Connecticut

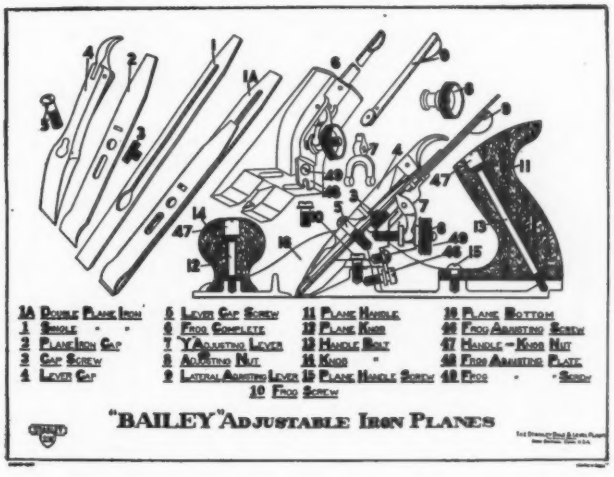


Steel Smooth Plane No. S4

Steel Jack Plane No. S5



Steel Block Plane No. S18



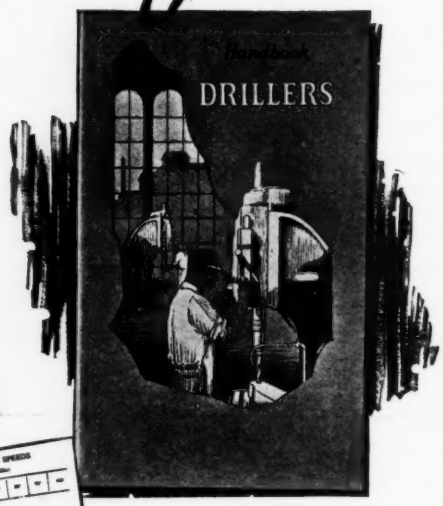
THIS CHART WAS MADE TO HELP THE BUSY INSTRUCTOR

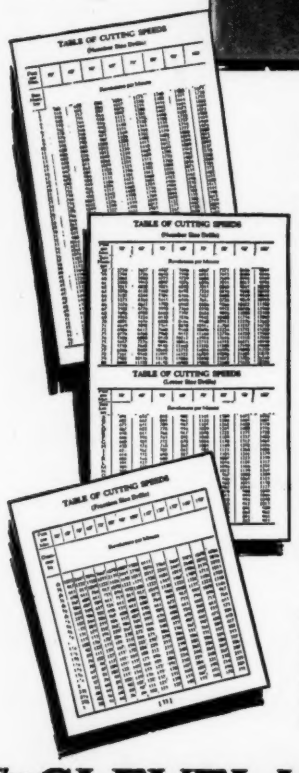
The use of the above chart will save time and aid materially in instructing the pupil in the construction and nomenclature of the tool. This chart and others on the chisel, hammer, screw driver, common joints, try squares, etc. are free for classroom display. Send for them today if you have not been supplied.

STANLEY TOOLS

STANLEY EQUIPMENT S.W. IS STANDARD EQUIPMENT

Do you know the right drilling speeds?





AT what speed and feed should a 1/16-inch carbon steel drill be started? A 1/4-inch high speed steel drill? What is the difference in the starting speeds when drilling in machinery steel, brass and cast iron? How many revolutions per minute does a 5/16-inch drill make operating at a speed of 50 feet per minute?

All of these questions are answered for you on pages 32 to 35 of the Handbook for Drillers, which Vocational School Directors and Instructors tell us is the most authoritative textbook on twist drills and drilling practices published.

As our contribution to vocational education, we want to send copies of this Handbook, in any reasonable quantities, to Directors and Instructors for use in their machine shop classes.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND
NEW YORK-CHICAGO-LONDON

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

Manufacturers of Carbon and Cle-Forge High Speed Drills for every purpose; "Mezzo" Super-Carbon Drills; Hand, Jobbers' and Shell Reamers; "Peerless" High Speed Reamers; "Paradox" Adjustable Reamers; "Quick-Set" Reamers; "Spirex" Machine Taper Pin Reamers; Chucking Reamers for Turret Lathes; Counterbores; Countersinks; Sockets; End Mills; and the "Exy-Out" Screw Extractor.

NEWS AND NOTES

Detroit Wins Model Plane Race. Jack Loughner, 15 years old, of Northwestern High School, Detroit, Mich., recently won the Mulvihill trophy, national championship in the model airplane flying contest at the national air races held at Philadelphia. With the trophy, Loughner gets $200.

In the races, two other Detroit boys were entered, Earl Nellis, 18 years old, was seventh, winning $15, and Robert Hayes, 17 years old, was eighth with $10. Second place, with a prize of $100, was taken by Joseph Lucas, of the Illinois Model Aero Club of Chicago. Bertram Pond, of Chicago, winner of the race last year, was third, winning $75.

Loughner, Nellis, and Brady were guests at the races of The Free Press of Detroit as a result of their victory at the final contest held in August. They are considered the best builders of model planes, and before reaching Philadelphia, went to Washington and other places as guests of the Detroit Free Press.

Simplicity of construction and lightness of weight were features in the models flown by the Detroit winners. There were others embodying new ideas in design and construction, but they were ruled out because of excessive weight. All of the winning types were of the pusher type and weighed under two ounces.

There were fifteen other entrants in the races, many of them coming from New York, Pennsylvania and the District of Columbia, and some from Chicago.

A national association of model flying clubs was formed at the close of the races by the boys participating in the Mulvihill trophy contest. Joseph A. Lucas of the Illinois Model Aero Club, was elected president, and Merrill C. Hamburg, of Detroit, was elected secretary and treasurer.

Plans were also made for a national contest for indoor model flying during the winter, to be managed similar to the races between Detroit and Chicago last winter. Following this contest, the trophy offered by William B. Stout will be awarded the winner.

Classes for Talented Art Students. A feature of the work of the New York School Art League this year will be an extension of its service to school children and the inauguration of new projects. Prominent among the new projects will be the museum research classes to be conducted by the Metropolitan Museum of Art, in cooperation with the Art League on Saturdays, beginning with October 23rd. The lessons will consist of practical work in color and design, based upon the study of objects in the museum.

There will be two classes of twenty pupils each, one for high school and the other for elementary school pupils. Each high school will be represented by two students selected by means of examples of their work and recommendation of the teacher. The elementary pupils will be selected through the director of art in elementary schools.

The success of the Saturday morning classes in drawing for gifted pupils at the Washington Irving High School, Flushing, and Stuyvesant High Schools, has resulted in the establishment of a similar class at the Erasmus Hall High School in Brooklyn.

Talks for senior and junior high school pupils who are junior members of the league, and for elementary school pupils will be given this year at the Metropolitan and Brooklyn Museums, the Fine Arts Building, the Museum of Natural History, and the French Museum.

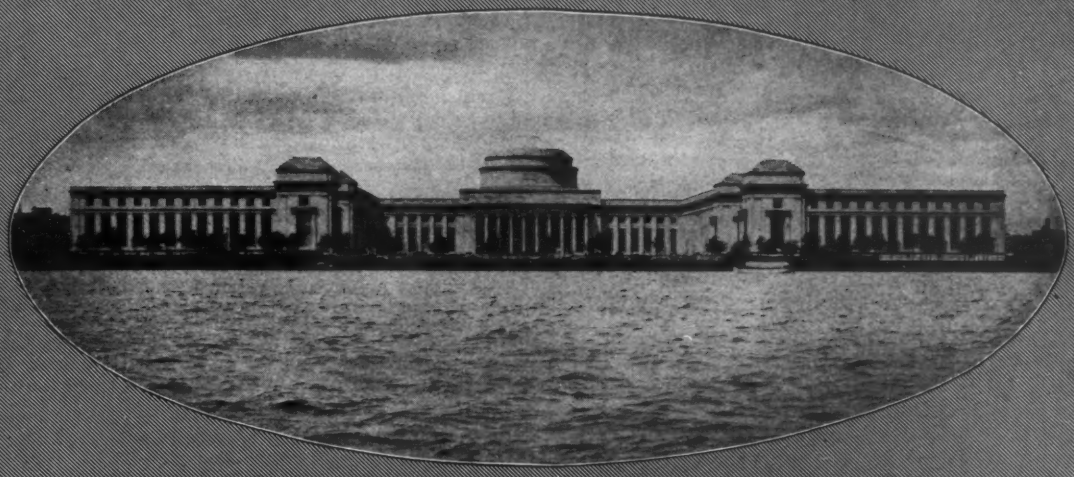
The plan of practical cooperation with furniture manufacturers in the placing of winners of the Haney Fine Craftsmanship Medals will be continued. Between twenty and thirty of the boys who excelled in shop work in the elementary schools last June have been given positions.

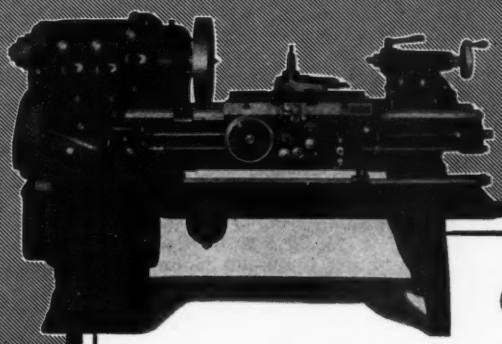
Farm Shop Course. A two-weeks course in farm mechanics, held the past summer at the Oregon Agricultural College at Corvallis, was especially valuable to the agricultural teachers of the state. Those taking the course numbered 25, which included seventeen Smith-Hughes agricultural teachers of Oregon, three vocational teachers from high schools of Washington, and one from Idaho.

Special committees reported on phases of the work to be conducted next year. Two recommendations were made for raising the standard of instruction in high school courses. One was that an itinerant instructor be provided to teach welding, surveying, tool-shaping, and gas-engine work. The other was that a one-week course in farm mechanics be offered in each Smith-Hughes district by a college or extension service instructor.

The committee in charge of plans for the farm shop course at the college next summer suggested that it in-

(Continued on Page 28a)





and now—

The Massachusetts Institute of Technology uses The

MONARCH Helical Geared Ball Bearing LATHE

as a part of their Metal Working Equipment.

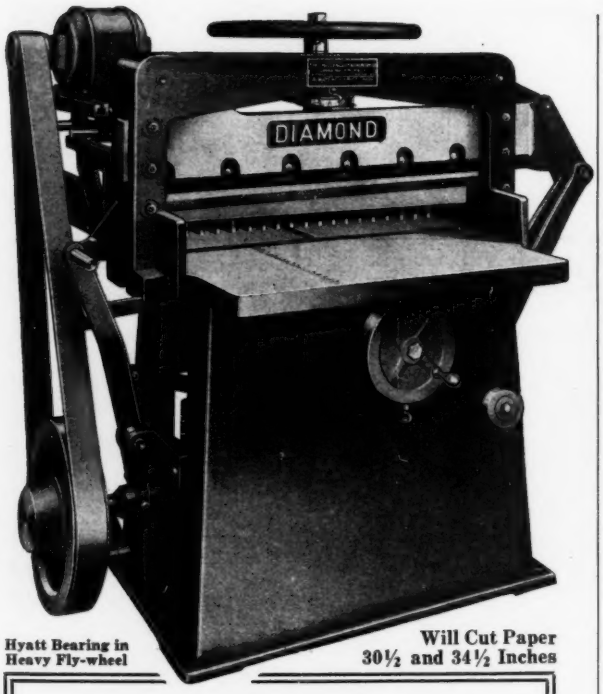
The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

In choosing the equipment for these students, the directors of the Institute must base their choice upon equipment that will give students the greatest possible amount of experience.

We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

THE MONARCH MACHINE TOOL COMPANY, 404 OAK STREET, SIDNEY, OHIO.



Hyatt Bearing in Heavy Fly-wheel

Will Cut Paper 30½ and 34½ Inches

DIAMOND
Power Cutters

are Rapid, Powerful, Durable, Accurate, Convenient, Safe and Most Attractive

Diamond Cutters are also made as Lever Cutters to which power fixtures can be easily attached

Send for full information regarding Diamond Cutters and for literature describing any of the following machines and utilities used throughout the world in the Graphic Arts:

Advance Lever Paper Cutters
Lee Two-Revolution Cylinder Press
Hoerner Combination Type-High Machine
Challenge Addressing Machine
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Challenge Pressed Steel Galleys
Challenge Rigid Rim Galleys
Challenge Iron Sectional Blocks and Hooks
Challenge Type-High Gauges
Challenge Quoins and Keys

The Challenge Machinery Co.

GRAND HAVEN, MICHIGAN

Chicago, 124 S. Wells St. New York, 220 W. 19th St.

(Continued from Page 26a)

clude drawing, care of tools, drainage and surveying, and water plants and sewage disposal.

Federal Field Agents and Specialists Meet. Twenty-five field agents and office specialists of the Federal Board of Vocational Education met in the office of the board at Washington, during the week of September 7th, to consider the work of the staff for the fiscal year. Mr. J. C. Wright, director of the board, was in charge of the meeting.

The meeting was the annual conference at which various problems of promotion, administration, supervision, and research arising in the work of the Federal Board are taken up. One of the problems confronting the board is that of meeting the rapidly increasing demand for assistance in the improvement of foremanship. The question of ways and means by which conference leaders may be trained for carrying on foreman training is of considerable importance at the present time.

Another problem of importance is the development of modern apprentice education. With the breaking up of the old relations between the master workman and the indentured apprentice, it has become necessary to develop ways and means by which the young worker may be educated and retained in the knowledge and skill of his craft.

Sign Painting Course. Among the trade courses to be offered to young men and women at the Bushwick Evening Trade School, Brooklyn, N. Y., during the winter are sign painting, show card writing, and commercial art lettering. These courses cover all branches of the trade and are intended for the apprentice and art student. Instruction and material are free to students.

Civil and Mechanical Engineering Course. The city of Erie, Pa., has cooperated with the engineering extension division of the Pennsylvania State College in conducting a night school offering practical and theoretical instruction in civil, electrical, industrial, and mechanical engineering branches. The course provides three years' work in the four branches of engineering, civil, electrical, mechanical, and industrial. A fee of $30 is charged each student, which includes tuition, textbooks, janitor service, supplies, etc.

Under the cooperative arrangement, the school district furnishes the light, heat, janitor service, rooms and buildings at the rate of $1 per student, and must also cooperate in making the work a success. On its part, the engineering extension division agrees to give certificates only to students taking the course outlined Rooms and buildings provided by the school district are to be held jointly by the school district and the engineering extension division.

New Department in Industrial Education. A new department in trade and industrial education has been organized this year at Roseburg, Ore. It is a part of the high school and will be operated on the cooperative plan, under which students will work four hours each day and attend school three hours. The success of the plan depends largely on the efforts of the instructor, whose chief duty will be to coordinate the school work with the employment.

Cooperate in Operation of Vocational Program. The school board of Portland is cooperating with the Oregon State Board of Vocational Education in the conduct of the vocational program in that city. A supervisor will be elected who will have charge of the various classes and schools which are conducted by the state board.

Motion Picture Film on Mining of Minerals. The Bureau of Mines, of the United States Department of Commerce has the largest collection of educational picture films depicting the mining, treatment, distribution and utilization of the essential minerals. At present the Bureau's collection comprises more than fifty subjects visualizing the operations of the mineral and allied industries.

The Bureau also has a number of highly interesting films depicting other important industries. Among these are "The World Struggle for Oil," "The Story of Petroleum," "The Story of Coal," "The Story of Sulphur," "The Story of Asbestos," "The Story of Steel," and "The Story of a Rotary Drilled Oil Well," and "Twelve Points of Safety."

The utilization of that important refined product of petroleum, gasoline, is portrayed in the following films: "The Story of an Automobile," "The Story of a Gasoline Motor," "The Story of a Motor Truck," "The Story of a Spark Plug."

The production of the films is conducted under the supervision of Mr. M. Leopold, safety engineer, and the distribution is centered in the United States Bureau of Mines Experiment Station, Pittsburgh, Pa., under the di-

(Continued on Page 32a)

Cabinet Department, Camden, N. J., High School

Pattern Shop

The Importance of Correct Methods of Shop Practice

Camden, N. J. High School

A teacher who strives for correct methods of shop practice knows he can reach that ideal only by the use of real industrial machines. Such a man is Mr. Harley E. Smith, Instructor in Woodworking in the Camden High School, Camden, N. J.

MR. HARLEY E. SMITH
Instructor of Manual Training

The two illustrations at the top show sections of the Pattern Shop and the Cabinet Department in this school and the following is a list of Yates-American machines in each.

CABINET DEPARTMENT	PATTERN SHOP
No. 5 Sander	No. 13 Pattern Maker's Lathe
36" Band Saw	10-12" Speed Lathes
Hollow Chisel Mortiser	36" Band Saw
Self-contained jig saw	No. 2 Surfacer
1 - Speed Lathe	12" Jointer
	No. 20 Universal Saw

The tools of school are the tools of life

YATES-AMERICAN MACHINE COMPANY

EDUCATIONAL DEPARTMENT

BELOIT, WISCONSIN

BISON BRAND GLUE

100% Adhesiveness

A superior adhesive manufactured by the same process as Pure Food Gelatine, under ideal climatic conditions. This process, and the careful selection of raw material, yields a glue of 100% adhesive matter.

The most vital consideration in buying glue is its keeping properties. The BISON BRAND being 100% pure, its keeping properties are guaranteed.

The unusual adhesive strength and penetrating qualities make it an ideal glue for all requirements of the woodworking industry and school shops.

Uniformity is guaranteed.

Liberal working sample submitted upon request in Sheet, Flake or Ground form.

HENRY WILHELM COMPANY, INC.
134-136 Tenth Street PITTSBURGH, PA.

Stearns CLAMPS

No. 32 Universal Clamps

No. 10 Clamp Irons

No. 9 Cabinet or Floor Scraper

We manufacture a complete line of clamps for all purposes and other tools adapted for your use. Write for Catalog D.

E. C. STEARNS & CO.
Established 1864
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(A Name with a meaning)

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COPPERLUM
Automatic Electric Glue Pot.

PATENTED

Copperlum Pot is of demonstrated value, superior in design, construction and results. Aluminum Jacket and Cover — Copper Glue Container—Light Weight—Attractive—Durable — Economical — Low Current Consumption. Dry or Wet Heat. **Reliable Heat Control instead of Hand Switch. Either Fixed or Removable Glue Cup.**

It's a Real Pot — Get One Now on Trial — Specify Size and Voltage

Also have the 3 Heat Hand Switch Pot for those who want that kind.

SPECIALTIES FOR GLUING VENEERING AND BUILT-UP WORK

Hydraulic Veneer Presses. Screw Veneer Presses. Quick Loading and Unloading Devices. Retaining Clamps. Trestle Clamps. Piano Back and Rim Clamps. Double Clamps. Dry and Wet Electric Glue Pots (Three Heat and Automatic) with Fixed or Removable Glue Container. Bench Spreader for Overlay, Etc. Power Feed Glue Spreaders for Animal Glue. Vegetable and Casein Glue Spreaders and Mixers. Joint or Edge Gluing Machines. Glue Heaters and Glue Cookers (Steam, Gas or Electricity). Etc., Etc.

Francis EST. 1880. **RUSHVILLE, IND.**

Specialists in Glue Room Equipment since 1880.

TECHNICAL EDUCATION

America has an unbalanced and top-heavy system of technical education compared with European systems. Material equipment is excellent, but the full possibilities of its use are lost. Material and teaching routine is exalted above men, and the men are paid in neither money nor honor.

American colleges are handicapped by a comparatively flabby and superficial scheme of secondary education, and they recover only about half the deficit by intensive four-year programs. Technical students abroad are expected to get themselves an education under the guidance of creative men and in an environment of real intellectual production, while here students are given an education. Our colleges are elaborate schoolhouses; our students, overgrown school boys; and our professors, glorified schoolmasters.

In general, our program of technical education is suited to students of medium grade of ability and it overlooks young men of native ability and mental energy.

Continental Europe depends on the higher technical schools as research centers, while the large industrial research laboratory is essentially an American institution and is a handicap as far as education is concerned.—William E. Wickenden, in "Mechanical Engineering," July. 1926, p. 794.

PERSONAL NEWS

Mr. A. R. Nichols has resigned as supervisor and teacher-trainer of trade and industrial education in Oregon, to accept a position at San Jose, Calif. Mr. Nichols was for more than five years in charge of the trade and industrial work in Oregon, and the development of this phase of vocational education in the state has been due in large part to his efforts.

Mr. W. B. Davison, of River Falls, Wis., has been elected head of the history department of Stout Institute, Menomonie, Wisconsin, to succeed Miss Dolores Hurst.

Mr. Davison received his education in the Wisconsin schools and is a graduate of the State University. Following his graduation, he taught for a number of years in the schools of Wisconsin and Indiana, and during the last twelve years has been head of the history department in the River Falls Normal School. Mr. Davison is the author of a number of books and is a frequent contributor to the educational magazines.

Mrs. Minnie W. Taylor has been appointed as vocational teacher by the state board of education of Oregon, and will have charge of the advanced classes in garment making and design.

Mr. H. C. Miller, formerly instructor of printing in The Dalles, Ore., high school, has resigned to engage in newspaper work.

Mr. Ralph Wyatt has been appointed teacher of manual training at Georgetown, Ky.

Mr. H. J. Karl has been appointed as instructor in the automobile department of the vocational school, New Bedford, Mass.

Mr. W. R. Bunnell has been appointed instructor in carpentry in the vocational school, New Bedford, Mass., to succeed Harold Cowling.

Miss Clara H. Krauter has been appointed principal of the Girls' Vocational School at Newark, N. J. Miss Krauter succeeds Miss Griselda Ellis and was formerly director of a similar school at Atlantic City.

Mr. Frank W. McMullen of Franklin, Ind., has resigned to accept a position in the schools of Gary, Ind. Mr. McMullen is a graduate of the Rose Polytechnic School and is an expert in the teaching of woodworking, metal work, auto mechanics, and basket weaving.

Mr. Paul Vancini has been elected assistant supervisor of drawing at New Bedford, Mass., to succeed Miss Blodwin Williams.

Mr. W. C. Boultinghouse of Rockport, Ind., has been elected assistant manual training teacher in the junior high school at Owensboro, Ky.

Mr. J. W. Bollinger, formerly teacher of sheet metal work in the East Junior High School, Sioux City, Iowa, has been made instructor in charge of general metal shop in the Theodore Roosevelt High School, Tulsa, Okla.

Mr. C. L. Angerer has been appointed State Supervisor of Vocation Education for Missouri, with headquarters at Jefferson City. Mr. Angerer succeeds G. W. Reavis.

Mr. George W. Barr, for five years supervisor of agricultural education in Nevada resigned July first to enter the University of California where he will complete his studies for a doctor's degree.

Mr. R. B. Jeppson has been appointed to succeed Mr. George W. Barr as supervisor of agricultural education in Nevada.

Miss Ruth A. Talboy has been appointed head of the home economics work in Nevada.

Mr. A. E. MacArthur, for three years director of the Virginia City, Nev., School of Mines, has been elected director of vocational education for the McGill and Ruth school districts. **Mr. J. C. Gilbreth** of Hawthorne, Nev., succeeds Mr. MacArthur at Virginia City.

Miss Iva C. Blosser, of the University of Colorado succeeds Miss Marjorie Chapman as director of home economics at Winnemucca, Nev.

Free

THIS VALUABLE BOOKLET

an aid to *instructors* tells how to select use and care for BITS!

Manual training instructors will find this illustrated 48-page booklet a real help in promoting class interest and an appreciation for good tools.

Between its covers is a wealth of interesting and authoritative data based upon 41 years' experience in the bit making industry.

There are detailed illustrations showing how bits are forged and machined, the parts of a bit and their functions, how to sharpen a bit properly, how to re-straighten the twist, and how the design of the cutting head is varied to meet the requirements of different classes of work.

Please return the coupon and we will be glad to mail you a sample copy free of charge.

THE IRWIN AUGER BIT CO.
WILMINGTON OHIO

Largest Makers of Wood-Boring Tools in the World.

THE IRWIN AUGER BIT CO.,
WILMINGTON, O.

Please send me a sample copy of booklet, How to Select, Use and Care for Bits.

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"YANKEE" Action is Smooth as Silk

So smooth that practically no effort is needed to drill holes—this means speed.

Just push! Then notice the action. You can hardly realize that the point is actually turning and quickly biting its way into the wood.

For like all "YANKEE" Tools, the design of "YANKEE" Automatic Push Drills is so ingenious and the construction so superior, that time and labor are reduced to a minimum.

Drill point revolves backward in upward movement of handle to clear chips.

Eight Drill Points, 1-16 to 11-64 inch in handle of each Drill. And every single one of them has been given the "YANKEE" individual test.

No. 41 (illustrated). No. 44 has spring with Adjustable Tension to regulate pressure suitable for difference in hard and soft woods, or for large and small Drill Points. Turn cap on handle to get any tension you need.

Some Other "YANKEE" Tools

Ratchet Screw-drivers
Ratchet Bit Braces
Ratchet Breast and Hand Drills
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Vises, Removable Base

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"Yankee" on the tool you buy means the utmost in quality, efficiency and durability.

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New "Yankee" Tool Book

This interesting little book is for all lovers of fine tools. It tells just what you want to know about all the famous "Yankee" Tools. Write for your copy today.

NORTH BROS. MFG. CO., Philadelphia, U. S. A.

"YANKEE" TOOLS

Make Better Mechanics

(Continued from Page 28a)

rection of Mr. R. A. Wood. The films are loaned free of charge, but costs such as express charges and postage, must be paid by the borrower.

Vocational Course for Boys. The high school at Hagerstown, Md., is offering a vocational course for boys 14 years of age or over. Under the new arrangement, the present courses in manual training will be continued for first and second-year classes, but the vocational course will be open to any boy who desires to take the work. The courses will prepare boys for cabinet making, carpentry and pattern making trades, and will be two years in length, with a diploma to be awarded at the completion of the work.

Vocational Work Planned. Vocational work is planned as a part of the course of study at Gulfport, Miss.

Manual Training Work Resumed. Manual training work has again been included in the course of study at Martinsburg, W. Va., following its suspension for the last two years.

Vocational School Enrolls Large Number. The Boys' Vocational School at Newark, N. J., opened with an enrollment of 625 boys. It is estimated that between fifty and sixty boys will be handled in the try-out department, which offers brief try-out courses in an effort to determine the pupil's most pronounced aptitude. It is planned to organize a sheet metal class in the near future.

Vocational Work Added in High School. A cooperative vocational course will be offered in the high school at Chattanooga, Tenn., this year. There will be a three-year period of training in school and in some industry of the pupil's choice. The plan calls for the first year's training to consist of three hours per day working at a trade and three hours of school work in some related subject. The first-year period will be followed by two years on a part-time basis in industry, with two boys working alternately at the same job.

At the close of the three-year period of training, the boys taking the vocational work will be graduated with the rest of the class, provided they have made good in both the school and shop work.

Industrial Program Established. A complete industrial program has been established in the high school at Mansfield, Ohio. The program will be conducted in accordance with the Smith-Hughes law.

Offers Two Courses for Vocations. Courses in retail salesmanship and auto mechanics have been introduced in high schools at Akron, O., for the new school year. The courses have been selected because of the small amount of funds necessary, and will form the basis for enlarging the program as the funds permit.

Large Fund Received for Vocational Program. The Chicago board of education has received $248,327 as reimbursement for the vocational program which the school system maintains under the terms of the national vocational law. The Chicago board of education operates twelve branch schools, the instruction of which is of a three-fold nature. The total cost per year to the board for each individual is $30.43. The Washburne Continuation School devotes itself largely to the training of apprentices in the skilled trades. Membership in these classes has increased more than 300 per cent in the last four years.

Home Mechanics Courses for High Schools. Courses in home mechanics have been introduced in the junior high school classes at Lynn, Mass. The courses will be experimental in character and will be a test of the usefulness of such instruction.

Manual Training in County Schools. With the opening of the new school year, all schools in Santa Barbara County, California, have been provided with courses in manual training and home economics.

New Machinery Installed. An entire new equipment of machinery has been installed in the vocational department of the Schenectady, N. Y., high school to replace machinery recently condemned by the state education department.

Vocational School for Employed Persons. A day school for employed persons has been established at Fort Smith, Ark., as a part of the regular school system. Pupils over 14 years of age are eligible to the classes, and the instruction is free.

Vocational Courses for Railroad Men. The Union Pacific Railroad has cooperated with the board of education at Marysville, Kans., in the operation of an evening vocational school. The railroad pays the salary of the instructor, who is appointed by the board of education upon the recommendation of the railway officials. The

(Continued on Page 34a)

Have You a Little Paper in Your School?

The School News

A facsimile of the front page of a schoolpaper, such as may be published for the purpose of convincing parents of your children of the value of printing in connection with academic and vocational instruction in public schools.

VOL. 2 — ANY COMMUNITY, ANY STATE — NO. 1

The Value of Schoolpapers

WHAT the newspaper is to the general community the schoolpaper is to the school community. Both publications possess uncommon interest to their readers by the printing of news items, and both have the power of moulding public opinion. One influences mature minds; the other influences the youthful minds. Both are informative and highly educational. Especially is this latter statement true in the case of schoolpapers.

The schoolpaper has one distinct advantage in educational value—it is the product of its readers. To be successful it must represent the combined effort of every class in the school and be of interest to every student enrolled in those classes. The academic classes may be assigned the task of collecting news, preparing interesting articles, and revising the printers' proofs for errors in English construction, spelling and typography; the art classes may have charge of the illustrations and general typographic arrangements; the commercial classes may look after the business end of the publication, such matters as soliciting money for subscriptions or advertisements, making disbursements for paper, inks, etc. The actual work of type composition, imposition, presswork and binding will be done by the printing classes.

No other activity can combine into a single educational unity practically the entire facilities of the institution as does the schoolpaper.

With the installation of printing instruction in a school all the academic work is revitalized. English, spelling, arithmetic, grammar, and art will take on a different meaning to students who have hitherto regarded these studies merely as necessary evils. Taught in conjunction with printing, their great value as vital elements of education is realized.

Request us to send you a chart showing the "Mechanics of Journalism." It is free.

Information: The Education Department of the American Type Founders Company employs the services of professional educators, efficiency engineers and trained salesmen to aid you in establishing printing courses in your schools. With this Company the word "service" is spelled H-E-L-P.

For information write F. K. PHILLIPS, Manager, EDUCATION DEPARTMENT

American Type Founders Company

300 Communipaw Avenue, Jersey City, New Jersey

"Where's your combination square"

Any man that's ever worked with a Starrett Combination Square can't see how it's possible for anybody else to try to get along without one.

And they are—those No. 94's—just about the most useful tool in the chest. They replace seven separate tools—square, miter, height, depth and marking gages, rule, level and plumb—and they'll do the work of each just a hair better than the original tool would do it.

If you haven't a Starrett Combination Square in your chest now, your nearest good hardware dealer has one that he'll part with—for a consideration. And it's worth it. It's also worth while writing us for a free copy of Catalog No. 23"CE."

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS.

Starrett No. 94
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Use Starrett Tools

(Continued from Page 32a)

course covers four years and affords opportunity for firemen and maintenance men to receive instruction leading to advancement and better work.

Open New Trade School. The Brewster Vocational School at Tampa, Fla., opened its doors for the first time with the opening of the schools in September.

The school offers courses in the major trades and was completed at a cost of $125,000. It was made possible through a gift of land amounting to $75,000 by the widow of Henry W. Brewster. The building is equipped with machinery costing approximately $25,000.

The school offers courses in plumbing, carpentry, electricity, automobile mechanics, bricklaying, printing, millwork, shorthand and typewriting, bookkeeping, cooking and sewing, drafting, sheet metal work, machine shop practice, and commercial Spanish. Mr. W. R. Scheel is principal.

Employment Bureau for Farm Boys. An employment bureau for securing positions for farm boys of Florida is proposed by the state and federal departments of vocational agriculture. The purpose of the bureau is to provide worth while farming occupation for farm boys at all seasons of the year. Particular attention is to be given to keeping the boys on their home farms, or securing suitable employment in a community where farm methods are similar to those practiced in their own localities. The Bureau will be conducted as a part of the Smith-Hughes vocational work and will have the effect of promoting the advancement of national agriculture.

Vocational Home Economics Course. A vocational home economics course offering four units of credit has been added to the high school work at Tarkio, Mo. The course includes work in home decoration, art, related art, costume design, and millinery and is intended to meet the practical needs of the home. It meets the needs of girls over 14 years who are not able to finish high school.

Vocational Department Added. A vocational department has been added to the course of study at Granite City, Ill. Mr. L. G. Lease, of Joliet, Ill., has been employed as director of the new department.

Iowa Vocational Board Requests Appropriation. The Iowa State Board of Vocational Education has asked for an appropriation of $50,000 annually to make up for a loss in federal funds.

Vocational Classes Inaugurated. Smith-Hughes vocational classes in sheet metal work, machine shop practice, commercial art, electricity, and mechanical and architectural drawing have been introduced at the Tech High Evening School, Atlanta, Ga. A small fee is charged to cover the cost of materials.

Coordination Department Organized. A student coordination department is a new feature of the Boys' Vocational School at Newark, N. J. The department will handle the problem of vocational guidance and will act as a tryout department for boys entering the school. Mr. Rudolph Skrevanek is in charge of the tryout work.

New Evening Courses for Apprentices. The Essex County Vocational Schools at East Orange, N. J., opened the fall term with a variety of courses, including automobile mechanics, bricklaying, cabinet making, carpentry, drafting, electrical work, foundry work, machine shop practice, painting and decorating, printing, tool making, sheet metal work, and industrial chemistry.

Two new apprentice groups have been added with evening classes for painters and decorators and plumbers.

Trade School for Boys in New Home. The Cleveland apprentice training school at Cleveland, O., has been renamed the Boys' Trade School and is housed in the remodeled Eagle school building. The building is equipped with every facility and the most modern equipment for the training of boys in the trades. Mr. M. D. Jones is principal of the school and acts under the direction of Mr. H. L. Briggs, director of vocational education.

The Cleveland plan under which the school is conducted involves complete cooperation with organized labor and with employers, and includes also the assistance of the various trade and employers' bodies in placing apprentices in the schools and in the direction of their studies. The plan calls for instruction during working hours and apprentices are paid for their full time, whether at work or at school.

Southern Trade Conference. Members of the trade and industrial education staff of the Federal Board for Vocational Education held a conference the past summer at Blue Ridge, N. C. The conference dealt with problems in foremanship, local supervision and teacher training in

(Concluded on Page 37a)

Commercial Showcard Artists Use "PRANG" Tempera

A Hint to Art Teachers Desiring to Make Their Courses More Practical

AS much as possible, have your students work with the actual "tools" they will have to use when they get out into the commercial world. Many a student is baffled by the new usages and practical "short cuts" that confront him when he gets a job in a commercial art shop and starts to work.

If you will have your classes in show card and poster art use "Prang" Tempera Show Card Colors, you will take an important step in that direction.

Commercial show card shops use "PRANG" Tempera because—

1. ***Less Need of Mixing.*** "PRANG" Tempera has 12 graded steps of standard colors; that gives the artists definite colors they never had before and always had to mix, thus saving time and also giving truer results.
2. ***Certainty of Correct Results in Blending.*** When mixing ***is*** necessary, "PRANG" Tempera offers a "tuned palette," i. e., based on the standard color chart; that insures just the special shade wanted, quickly and ***accurately.***

You can train your students more practically for their later entry into the commercial field, by having them use "PRANG" Tempera Show Card Colors in class.

"Prang" Tempera A Better Showcard Color

Booklet, color card and samples sent you upon request.

THE AMERICAN CRAYON COMPANY

"Old Faithful"

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SAN FRANCISCO DALLAS NEW YORK

LEADERSHIP SINCE 1835

91 Years of Faithful Service

We want to help *make* your boys *better workmen*

You can only get out of a material what goes into it—your boys can do better work with good materials. Algoma is the Plywood with a "Personality"—we put into Algoma Panels all our ideals and long experience, which gives them an acknowledged leadership in panel construction. Thus Algoma is unequalled

for Cabinetmaking *and* General Use in the Woodworking Shop

Your boys are building for the future and so are we. To enable them to become acquainted with "The Better Plywood" and start right we will be glad to supply you direct from our stock warehouse in Chicago at wholesale prices. Large assortment of woods and sizes always ready for 24-hour shipment. Write for price list. Also

Write Our Service Bureau

Whenever you desire special advice in connection with the use of Plywood. Our experts will cheerfully assist you without charge.

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The Better PLYWOOD

Let us help you teach your boys, how to make clocks.

Hundreds of Schools the world over have found it a most fascinating project. It takes in a wide range of operations, drilling, sawing, moulding, wood turning, etc. We furnish full size blue prints of attractive, simple cases.

Write for our catalogue and details of our plan how you obtain our helps without cost.

We furnish works, dials, gongs, chimes, etc., for many styles of clocks from a little desk clock to the stately Grandfather's Clock.

American Chime Clock Company
1677 Ruffner Street,
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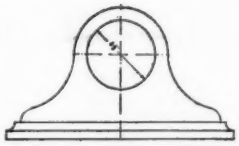


Students Do Wonderful Work

With the Carter-Shaper

It's simple, easy to set up and operate, will do a wide variety of work (including jointing), runs from any lighting socket, IS ABSOLUTELY SAFE and only costs $121.00 complete.

Write for catalog.

THE R. L. CARTER CO., INC.
1208 Chestnut St. Phoenix, N. Y.

KESTER *Self-Fluxing* SOLDER

Genuine Solder Containing its own Flux—Easy to Use—Requires Only Heat

A good standard of accomplishment is the objective of every teacher. The work is varied, skills are being acquired and the "puddled" solder job owing to the improper use of flux is particularly annoying.

Kester Self-Fluxing Wire Solder supplies its own scientific flux from tiny pockets inside itself as it is used. "It requires only heat," eliminating the acid pot.

The possibilities in favor of clean and substantial work on the part of the boy or girl doing soldering in the general shop are immediately apparent to the instructor because of the ease and convenience in the use of Kester Solder.

"Requires Only Heat"
Ready for use

Chicago Solder Co.
4259 Wrightwood Avenue
CHICAGO ILL., U. S. A.

KESTER *Acid Core* SOLDER

For general soldering on new or old work in the general shop, sheet metal shop, home mechanics shop, specify Kester Acid Core Wire Solder.

CHICAGO SOLDER COMPANY,
4259 Wrightwood Ave., Chicago, Ill.

Gentlemen:

Please send the following number of working samples:

.....Kester Acid Core Wire Solder

.....Kester Rosin Core Wire Solder

The number of boys in our shops are:

General Shop.....Electrical.....

Sheet Metal.....Home Mechanics.....

Signed.....

Instructor in.....School.....

City..... State.....

KESTER *Rosin Core* SOLDER

For all electrical soldering and radio work specify Kester Rosin-Core Wire Solder.

(Concluded from Page 34a)

trade and industrial education and was attended by 74 men from fifteen states. Mr. J. C. Wright, director of the federal board, attended a part of the conference and spoke at one of the evening sessions.

Manual Arts Building. At Bridgeton, N. J., a building near the school has been remodeled for use as a manual arts building. It contains five large rooms for various lines of shop work.

The report of the Massachusetts Board for Vocational Education for the fiscal year ended June 30, 1926, states that at the close of the year it was dealing with 310 active cases of civilian rehabilitation. Of this number, the report stated, 132 were under advisement and 178 were under supervision either in training or in employment. The statistical report shows that since the inception of rehabilitation work in the state in 1921, 13,734 contracts have been made.

Smith-Hughes Course in Agriculture. A Smith-Hughes course in vocational agriculture has been introduced in the schools of Beaver Dam, Wis.

High School Boy Wins Prize. Willie Kieg, a high school student at Ely, Nev., recently won first prize in the second phase of a contest in home planning conducted in connection with the Nevada Highways Exchange, in which boys from Nevada high schools competed. Tom White, a student in the Reno high school, won second place. The boys took plans submitted by the home economics classes and developed them from the architectural standpoint.

The Sparks and Fallon high school classes in home making were tied for first place in the preliminary competition, and Bunkerville high school was second. This was a contest for an original sketch to indicate what is a model four-room home.

Working drawings have been completed and plans are being made for the erection of the model building by the vocational carpentry class of the Reno high school. The interior decorations and furnishings have been worked out with the aid of the home economics classes of Nevada.

Museum Issues Educational Number. The latest bulletin (September) of the Metropolitan Museum of Art of New York City is devoted entirely to education, with discussions on the educational work of the Museum, and a calendar of the lectures. Among the branches of the work touched upon are the art collections, cooperation with the city's educational institutions, story hours for boys and girls, cooperation with the retail stores, study hours for teachers, home makers, and others, and films for educational purposes.

Vocational School. A vocational school has been established in the Irvin grade school, Tulsa, Okla., for the benefit of students who have not been able to attend school, or to complete the full grade work. The aim of the school is to teach practical things, and among the arts to be offered are manual arts, weaving, shoe making, rug-making and similar handicrafts. One-half of the day will be given to academic work and one-half will be devoted to vocational activities. The initial enrollment was 60 students but it is expected that it will eventually reach 150 students.

CHANGES IN THE PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

The vocational department of the Pennsylvania Department of Public Instruction has been reorganized with the appointment of Mr. H. C. Fetterolf as First Assistant Director of Vocational Education in charge of the administrative duties of the vocational bureau. Mr. Fetterolf, who succeeds Dr. F. T. Struck, has been a member of the vocational staff since 1915, and has served efficiently in the field of agricultural education and in general administration in the field of vocational education as assistant to the deputy superintendent of schools.

Mr. Paul Cressman, who has been assistant director of vocational education in charge of the continuation school division of the vocational bureau, has assumed charge of the industrial education division in addition to his present work as director of the continuation schools. Previous to becoming a member of the staff of the vocational bureau, Mr. Cressman was director of vocational education at Erie, Pa., where he made a splendid record as an administrator of practical arts and vocational education.

Under Mr. Cressman's guidance and assistance, it is planned to initiate some definite and important developments in the field of practical arts and industrial and continuation schools.

School Shop Equipment News

For the Supervisor and Teacher who desires to keep abreast with news of new Machinery, Tools, Supplies, etc.

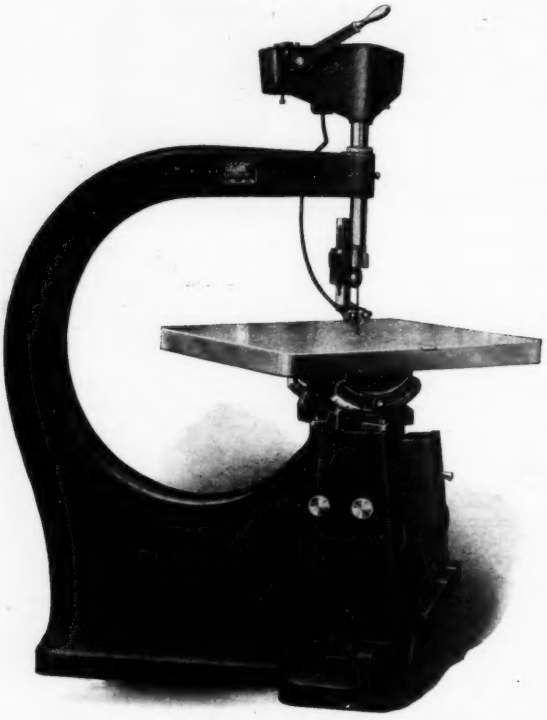
THE OLIVER JIG SAW

Well Adapted to School Needs

The new No. 173 Oliver Jig Saw is a machine of interest to industrial arts directors and teachers, since the overhead construction employed on the power machines is entirely eliminated.

In the past many school shops were unable to install the old type jig saw because of the lack of head room necessary for this machine. However, all large school woodworking shops will now be able to install this new type of jig saw, since the overhead construction is eliminated.

In place of the overhead mechanism which provided the tension in the old machine, large coil springs are mounted in a housing overhead in the new machine. These coils can be easily adjusted to get the required tension. The tension from the coils is carried down to the saw blade through a piano wire; moreover, a lever is provided on the outside of the housing that will release the tension on the same very quickly when saw changes are required.



A large reciprocating type air pump is also located in the housing overhead. The air is carried to the nozzle through flexible tubing. The blower nozzle is so arranged that it will raise and lower independent of the slide bar. The saw blades are of a new type, having pins on both ends that hook into slide blocks at either end. Thinner and narrower saws can be used, thus increasing its field of usefulness.

Ball bearing construction is used. The main bearings are run in a sealed housing with a fixed level. This construction makes it possible to run the machine with high efficiency and less power.

The table has been changed from square to forty-five degrees with the column to permit the maximum amount of cutting length. In addition, the machine has the capacity to take 16" saws with a three inch stock, and will take 10" under the guide.

The recent revival of scroll sawing and surface enrichment work in the furniture industry is setting the pace for the woodworking shops in the high schools suggesting the service of the new No. 173 Oliver Jig Saw in the school shop.—F. W. Z.

TRADE PUBLICATIONS

Issue Catalogs on Fans and Blowers. The Buffalo Forge Co., of Buffalo, N. Y., has issued two catalogs, one on Baby Conoidal Fans, and one on Electric Blowers. The first baby conoidal fan was built for ventilating a small testing room, and today, a complete series of sizes have been developed, ranging from the small No. 1 fan delivering 78 cu. ft. of air per minute, to the No. 6 delivering 6850 cu. ft. per minute. The capacity range is further amplified by the use of multiblade wheels of three distinct types, in sizes 4, 5, and 6. The conoidal fans are suitable for use in small offices, washrooms, toilet rooms, and for exhausting heat from cooking ranges, and gas from chemical laboratory hoods.

The F-B variable and constant speed electric blowers, described and illustrated in the second catalog, are widely used and are recognized as the most efficient small units on the market, for a variety of uses. The variable speed type is made in two sizes only—Nos. 2-E and 2-EH, and are used for supplying air to forge fires, as well as for other intermittent service.

The constant speed type are made in seven sizes with capacities ranging above 4,000 cu. ft. of air per minute. The larger sizes are used for blowing oil and gas furnaces and for cupola work. The smaller sizes are for small furnaces, for removing scale from power hammers, and chips in metal and woodworking operations, as well as for exhausting from grinding and buffing wheels.

Information concerning ventilating fans and blowers of the Buffalo type may be obtained by writing to the Buffalo Forge Co., at 490 Broadway, Buffalo, N. Y.

New Catalog of Manual Training Supplies. The Thurston Manual Training Supply Co., of Anoka, Minn., has issued its twelfth annual catalog of "hard-to-get" materials for the year 1926-1927. The firm has the most complete line of manual training materials in the country and many of the designs shown are their own design and manufacture.

The catalog contains 56 pages, describing and illustrating upholstery supplies, lamp shade supplies, electrical equipment, decalcomania transfers, cedar chest trimmings, wood finishing materials, phonograph hardware, fibre weaving supplies, and miscellaneous hardware specialties.

The catalog contains a complete index of the materials listed.

Changes Location of Plant. The Sta-warm Electric Heater Corporation, of Minneapolis, Minn., has announced the acquirement of a new and modern plant at Ravenna, O., which affords opportunity for a greatly increased production capacity.

The new location was made necessary because of the congested condition of the plant and the inability of the firm to obtain its enlargement with entire satisfaction. The new plant has many times the capacity of the former factory and is rounding out its second month of production in an attempt to catch up on unfilled orders.

Remove Offices. The Marqueterie Importing Corp., of New York City, importers of marqueterie designs and inlays, have moved their offices from 277 Broadway, to larger quarters at 1 Park Avenue Building. The firm is prepared to render service to schools in supplying inlay and marqueterie materials in any quantity.

Mr. Murphy Appointed Sales Manager. The J. D. Wallace Company, Chicago, Ill., has announced the appointment of Mr. J. B. Murphy as sales manager for the New York office. Mr. Murphy was formerly assistant to the sales manager in the Chicago office.

Mr. M. A. Cole has succeeded Mr. Murphy as assistant sales manager at the Chicago office.

Mr. Nelson Dies. Mr. Robert W. Nelson, president of the American Type Founders Company, and also of the National Paper & Type Co., of New York, died at Westfield, N. J., at the age of 74.

Mr. Nelson, who joined the American Type Company in 1894, was made its president and general manager in 1901. The National Paper Company was established by Mr. Nelson in 1900. He was active as general manager for the American Press Association for many years.

A CORRECTION

Through an error in proof reading the introductory paragraph of the article by Mr. Charles P. Coates on Veering Winds became garbled. The following is the introductory paragraph as it was originally written:

During the past two decades, thousands of travelers have read the inscription; but few have grasped its signification. It stands imbedded in stone over the doorway of an old storage warehouse near Union Station in St. Louis. Perhaps when this old building has passed the stage of ruinous decay, a bronze tablet will mark the spot; for it is one of peculiar importance. Here with challenging boldness an obscure engineer turned the channel of secondary education out of its plain of erosion: here Calvin Woodward built the first manual training high school in the world.

Seventh-grade boys in Bedford, Ohio, successfully developing Art-Fibre projects. Manual Arts Director, C. C. Steele.

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Social Arithmetic

Book Three. F. M. McMurray and C. B. Benson. Cloth, 338 pages. The Macmillan Co., New York, Chicago.

The present book which has been prepared by two well known mathematicians connected with two prominent universities, seeks to answer some of the problems confronting pupils of the junior high school grades. The data used for problems, instead of being supposed facts, are actual facts from reliable and authoritative sources. The sources of the data are well-known statistical references and the conclusions reached represent actual conditions and may be depended upon.

The book opens with an arithmetical study of the value of an education and proceeds to problems connected with personal accounts and banking, stocks and bonds, life insurance, renting and owning property, loans, notes and discounts. The second part takes up cost of goods, food supply, taxation, local, state and federal expenses, and the borrowing of money. There are a number of useful rules and tables, also a table of square root and weights and measures.

The Apprentice Plumber and His Opportunity

Published by the Apprenticeship Service Department of the National Trade Extension Bureau of the Plumbing and Heating Industries, Evansville, Ind.

This pamphlet may well be taken as a model of a type of vocational information which boys very much need before choosing a trade. It outlines clearly (1) what the plumbing trade offers the boy, (2) the work which the plumber performs, (3) the opportunities for promotion and the preparation necessary for it, and (4) the education needed to enter the trade and to progress in it. The pamphlet is written in a simple, unmistakable language and will be found useful for reading not only by boys but also by all vocational instructors.

Essentials of Mechanical Drawing

By Wm. W. Turner. Cloth, Quarto. Price, $2. John Wiley & Sons, New York, N. Y.

This book outlines a first-year course in the graphic language. The arrangement of topics follows well established lines, beginning with the use and care of instruments and materials, and taking up in sequence, lettering, orthographic projection, pictorial representation, geometric construction, projections, intersections, developments, and finally freehand sketching. A splendid group of supplementary problems and a collection of tables and diagrams for reference make up the two concluding chapters. The treatment of principles is complete and explicit, and directions for the plates will reduce the work of the instructor to a minimum. The illustrations are uniformly excellent, and the series of required drawings is well graded, amply difficult to require effort on the part of the student, and typical in the exposition of drawing principles. The chapter on pictorial drawing is a trifle brief and difficult in the position which it takes in the course. The book will serve equally well for introductory high school classes and for beginning classes in normal schools.

Agriculture Yearbook of 1925

One thousand five hundred thirty-seven pages. Price, $1.50. Published by the Government Printing Office. Washington, D. C.

This is the fifth edition of the yearbooks issued by the Department of Agriculture and dealing primarily with the economic aspects of the subject.

PUBLICATIONS RECEIVED

How the World Rides. By Florence C. Fox. Price, 25 cents. Bulletin No. 8, 1926, issued by the Bureau of Education, Washington, D. C. This pamphlet consists of a series of projects on vehicular transportation for elementary schools, tracing the history of the subject from the ox cart and settler's wagon of pioneer days, to the steam railroad, the electric car, the automobile and the airplane of the present day. While the material is easily adaptable to children in the intermediate grades, it is also useful as related work in the study of auto mechanics. Chapter III takes up a study of the automobile and truck, dealing with the science and use of the automobile in modern practice.

Instruction and Job Sheets for Armature Winding and Motor Work.

Prepared by Mr. W. L. McDougal, Holman School of Manual Training, Chicago, Illinois.

These job sheets include complete information sheets and job sheets in the elements of winding A. C. and D. C. motors. The problems are fully illustrated. The publication is a pioneer in a field which is growing constantly in importance.

Report of the Commission Appointed by the Secretary of Commerce for the International Exposition of Modern Decorative and Industrial Arts in Paris, 1925.

This report of which copies can be obtained from the United States Department of Commerce, Washington, D. C., presents the findings of a group of industrialists, designers, and art educators who visited the Paris Exposition in 1925 and studied the various industrial arts exhibits from the standpoint of improving American industrial art design. Teachers as well as manufacturers will be interested in the criticism of American furniture, textiles, stained glass, wall papers, books, etc., in the light of the modern movement in Europe. The paper on Art Education by Mr. Royal Bailey Franum is especially significant.

Grinding Wheels. Simplified Practice Recommendation No. 45, 1926. Price, ten cents. Issued by the United States Department of Commerce, Washington, D. C. The pamphlet lists fourteen types representative of practically all grinding wheels used on the standard makes of machines. The efforts of the Bureau of Standards have resulted in a reduction from 715,200 to 255,800

(Concluded on Page 42a)

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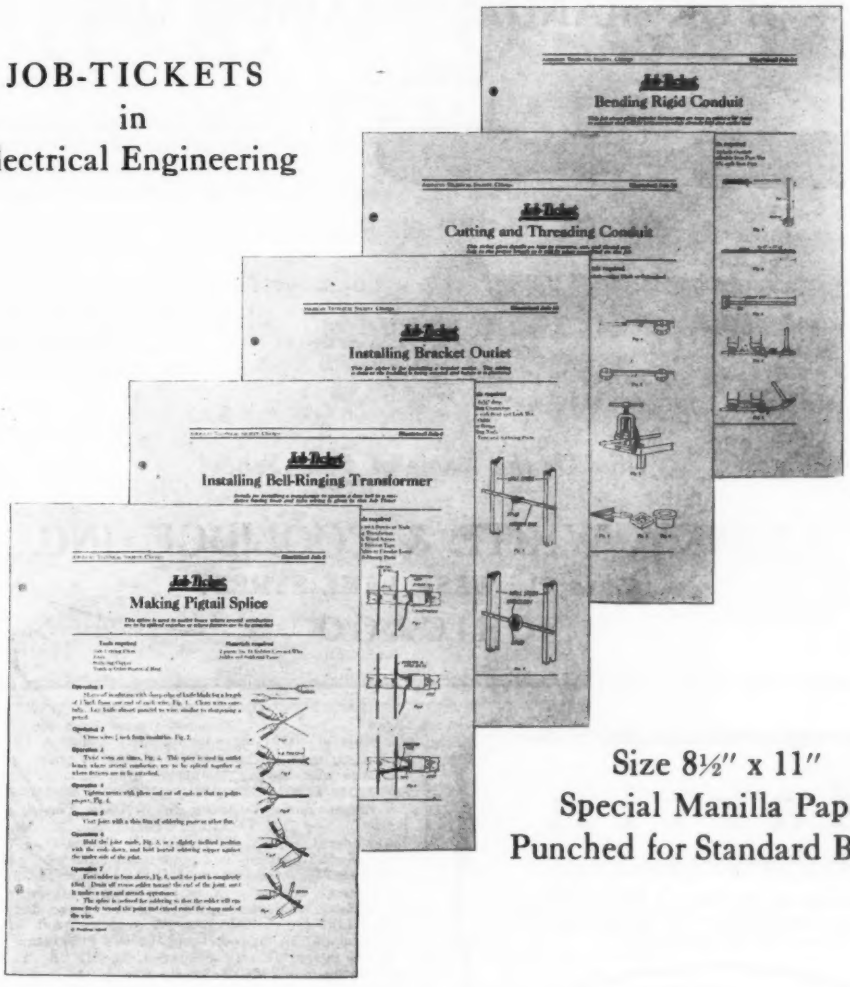

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(Concluded from Page 40)

varieties of grinding wheels, corresponding to an elimination of 64.23 per cent. The simplified list of sizes offers greater convenience and saving to users, and it is estimated will effect a saving of $5,000,000 a year to the machine industry.

Employment Training in Civilian Vocational Rehabilitation. Bulletin No. 110, Vocational Series No. 11, May, 1926, issued by the Federal Board of Vocational Education, Washington, D. C. The present bulletin is founded on sufficient practice and experience to be of value to rehabilitation workers in the establishment of efficient methods in employment training. The adoption of the salient suggestions outlined will make not only for a standardization and uniformity of practice, but also for a decided improvement in the efficiency of the program.

The material was prepared by Mr. R. V. Billington, under the direction of Mr. John A. Gratz, chief of the Vocational Rehabilitation Division of the Federal Board, and discusses such topics as the place of employment training, training objective, supervision of training, methods of supervision, and training program analyses.

Supervised Practice in Agriculture Including Home Projects. Bulletin No. 112, Series No. 29, May, 1926, issued by the Federal Board of Vocational Education, Washington, D. C. This is a revised bulletin which has been prepared for the purpose of interpreting the national vocational education act as it relates to directed or supervised practice activities. It was prepared by Mr. Robert D. Maltby and Mr. Arthur P. Williams, under the direction of the vocational director of the Federal Board, and is specially directed to vocational teachers of agriculture, to teacher trainers, and to state supervisors of agricultural education for the purpose of assisting them in discharging their respective responsibilities.

Physical Examinations in Industry. Industrial Health Series No. 2, issued by the Metropolitan Life Insurance Co., New York, N. Y. In 1915 the Metropolitan Insurance Company began the practice of requiring annual physical examinations of its employees by the company's physicians, or by the employees' personal physicians. The object in this has been to reduce or postpone deaths and disabilities from constitutional, chronic, and for the greater part, non-communicable disease. The pamphlet gives a list of the examination standards in reference to physical defects necessitating attention drawn up by the Conference Board of Physicians. A detailed list of classified second-degree defects is also published by the National Industrial Conference Board. There are a number of suggestive record forms for use in physical examinations, together with typical reports for the examining physician, and a bibligraphy on physical examinations. The booklet cites experiences to justify physical examinations in industry and periodic physical examinations in general and offers two layouts for physical examination rooms.

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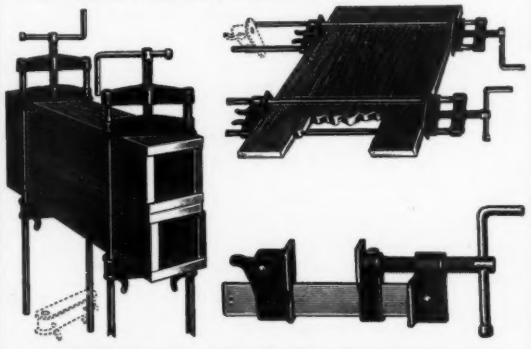

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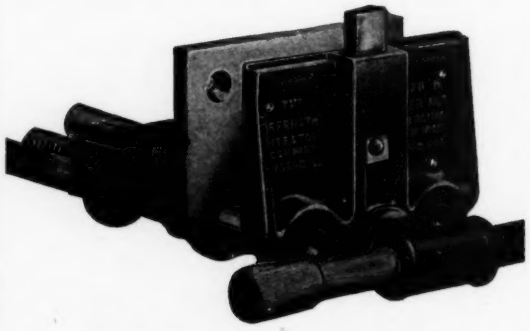

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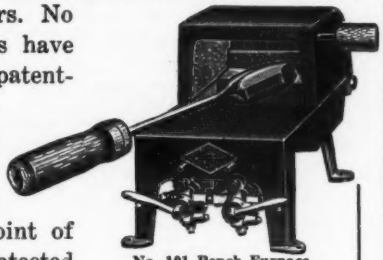

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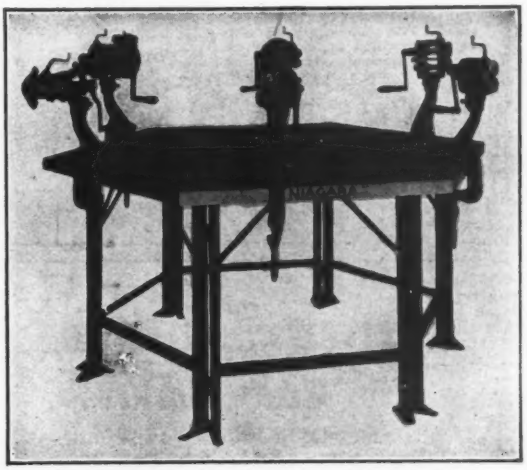

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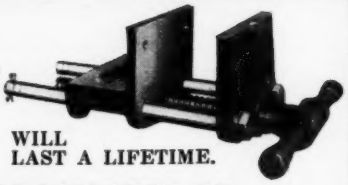

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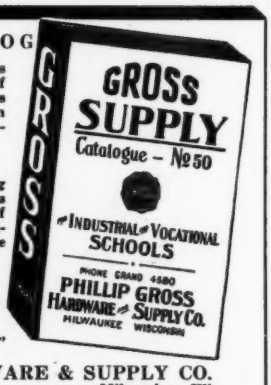

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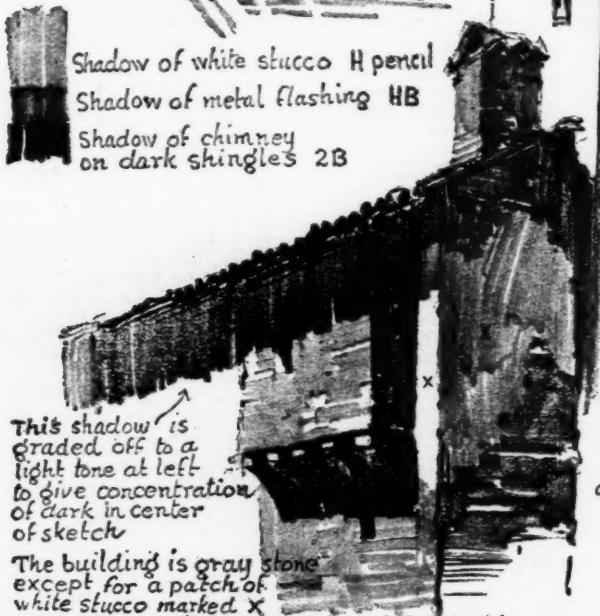
Shadow of white stucco H pencil
Shadow of metal flashing HB
Shadow of chimney on dark shingles 2B



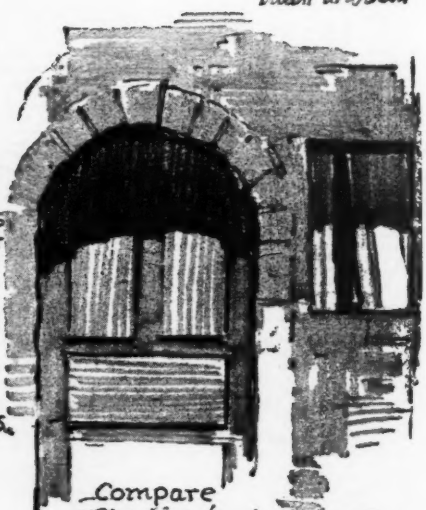
This shadow is graded off to a light tone at left to give concentration of dark in center of sketch

The building is gray stone except for a patch of white stucco marked X

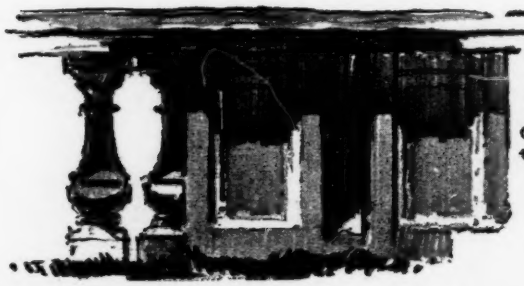
Gray stone is a light gray tone in sunlight – H pencil
It's dark gray shadows are made with the 2B pencil
Stucco, while in sunlight – HB in shadow

The darkest shadow on surfaces should not be black.

Reserve black for window and door openings.



Compare
Shadow on dark door
with Shadow on white curtain



Carefully drawn shadows define forms upon which they fall.

Don't use outlines when using light & shadow. There are no outlines in nature

This is one of a series of Pencil Lessons prepared by Ernest W. Watson. A portfolio of these lessons will be sent you on request. Write, too, for samples of Dixon's "Eldorado" and Dixon's "THINEX" Pencils—the latter for thin line checking and marking on drawings and blueprints. Both are supreme in their field. DIXON—PENCILS, Dept. 128-J, Jersey City, N. J.

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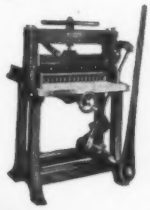

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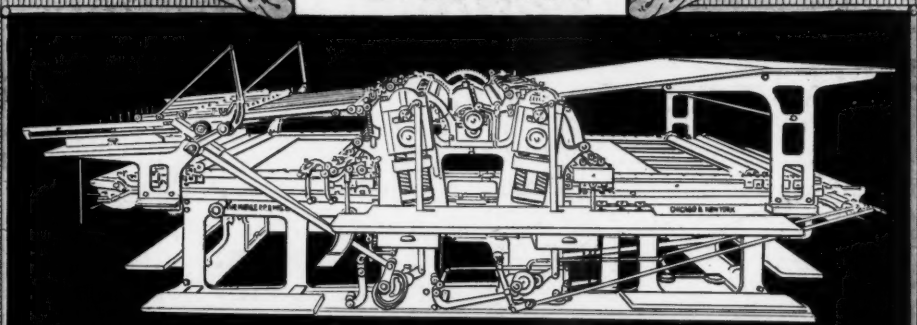

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